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(54) HEAT-DEVELOPABLE PHOTSENSITIVE MATERIAL

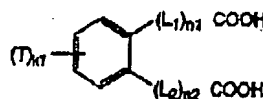
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(57) Abstract:

PROBLEM TO BE SOLVED: To obtain a heat-developable photosensitive material giving an image having a low fog and a high maximum density and less liable to the rise of fog in preservation by using a latex of a specified polymer, holding a specified organic acid compound and a nucleus forming agent on a side with an image forming layer and specifying the pH of the film surface on the image forming layer side.

SOLUTION: A latex of a polymer having -30 to +40°C glass transition temperature is used as 50 wt.% of the binder of an image forming layer containing a nonphotosensitive silver salt and a photosensitive silver halide. At least one organic acid compound of the formula and a nucleus forming agent are held on a side with the image forming layer and the pH of the film surface on the image forming layer side is 26. In the formula, T is a monovalent substituent, k1 is an integer of 0-4, in the case of k1², plural symbols T may bond to each other to form a ring, each of L1 and L2 is a combining group and each of n1 and n2 is an integer of



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the heat developing sensitive material for photoengraving process with Dmax (maximum density) able for fogging to be low in more detail and to obtain an image with few rises of fogging at the time of conservation highly about the scanner and the heat developing sensitive material for imagesetters which fitted especially photoengraving process about heat developing sensitive material.

[0002]

[Description of the Prior Art] It has a photosensitive layer on a base material, and many sensitive material which performs image formation by carrying out image exposure is known. Also in them, the technology which forms an image with heat developing is mentioned as a system which can simplify environmental preservation and an image formation means.

[0003] In the photoengraving-process field, loss in quantity of processing waste fluid is strongly desired from environmental preservation and a space-saving viewpoint in recent years. Then, it can be made to expose efficiently with a laser scanner or a laser imagesetter, and the technology about the heat developing sensitive material of the photoengraving-process use which can form the clear black image which has high resolution and sharpness is needed. In these heat developing sensitive material, use of solution system processing chemicals is lost, it is more easy and the heat developing processing system which does not spoil environment can be supplied to a customer.

[0004] The method of forming an image with heat developing For example, U.S. Pat. No. 3,152,904, Said 3,457,075 numbers, And it is based on B. sherry (Shely) with D. Morgan (Morgan). "with heat The silver system A processed" (the 8th edition (Imaging Processes and Materials) of Imaging Processes and Materials Neblette) (Thermally Processed Silver Systems) It is indicated in Sturge (Sturge), V. Walworth (Walworth), A. Shepp (Shepp) edit, the 2nd page, and 1969. Such a sensitive material contains nonphotosensitivity reducible **** (for example, organic silver salt) and the reducible photocatalyst (for example, silver halide) of the amount of catalytic activity, and the silver reducing agent in the condition of having usually distributed in the organic binder matrix. In ordinary temperature, although sensitive material is stable, when it heats to the elevated temperature after exposure (for example, 80 degrees C or more), it generates silver through the oxidation reduction reaction between reducible **** functions as an oxidizer) and reducing agents. This oxidation reduction reaction is promoted by the catalysis of the latent image generated in exposure. The silver generated by the reaction of the silver salt in which the reduction in an exposure field is possible offers a black image, and, as for this, formation of nothing and an image is made in a non-exposing field and contrast.

[0005] Moreover, although said heat developing sensitive material is known from the former, these many form the photosensitive layer by applying the spreading liquid which uses organic solvents, such as toluene, a methyl ethyl ketone (MEK), and a methanol, as a solvent. The cost top of using an organic solvent as a solvent is also disadvantageous because of recovery and others of not only the bad influence to the body in a manufacturing process but a solvent.

[0006] Then, such an anxious method of forming a photosensitive layer (it also being henceforth called a "basin syst photosensitivity layer".) using the spreading liquid of the aqueous intermediation which is not is considered. For example, the example which uses gelatin as a binder is indicated by JP,49-52626,A and JP,53-116144,A. Moreover, example which uses polyvinyl alcohol as a binder is indicated by JP,50-151138,A.

[0007] Furthermore, the example which used gelatin and polyvinyl alcohol together is indicated by JP,60-61747,A. T example of the photosensitive layer which uses a water-soluble polyvinyl acetal as a binder is indicated by JP,58-28737,A as examples other than this.

[0008] When such [to be sure] a binder is used, a sensitization layer can be formed using the spreading liquid of aqueous intermediation, and the merit of an environmental side and a cost side is large.

[0009] However, only what was spoiled remarkably [of commodity value / be / the optical density of the exposure

section is low in becoming the brown which was widely different from the black made desirable / the silver color ton of the spreading object which compatibility with organic silver salt is bad when polymer, such as gelatin, polyvinyl alcohol, and water solubility polyacetal, is used as a binder, and is equal to practical use on spreading **** not only being obtained but the development section / originally, and yellow, and / the concentration of the unexposed section high] was obtained.

[0010] the photosensitive silver halide particle used for heat developing sensitive material at Europe JP,762,196,B, JP,9-90550,A, etc. -- the -- a hydrazine derivative is contained in making metal ion or metal complex ion of a VII group or a VIII group (seven to 10 group) contain, and sensitive material -- making -- high -- it is indicated that a contrast photograph property can be acquired. however -- if ***** like the binder used with the spreading liquid of the above mentioned aqueous intermediation and a hydrazine is used together -- high -- although the contrast image could be obtained, it was easy to produce fogging in coincidence, and there was a problem that the rise of fogging at the time conservation was large, especially.

[0011] Then, fogging was low, Dmax (maximum density) was able to obtain an image with few rises of fogging at the time of conservation highly, and technology of offering an advantageous heat developing sensitive material in respect of environment and cost was desired.

[0012] [Problem(s) to be Solved by the Invention] Therefore, as the object for photoengraving process especially a scanner, and an object for imagesetters, especially the first technical problem that is going to solve this invention has low fogging, and is to offer heat developing sensitive material with Dmax (maximum density) able to obtain an image with few rises of fogging at the time of conservation highly. Furthermore, the second technical problem which is going to solve this invention is to offer the heat developing sensitive material in which advantageous basin system spreading possible in respect of environment and cost.

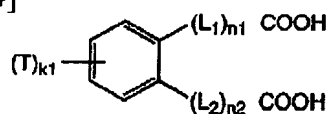
[0013] [Means for Solving the Problem] This technical problem was attained by the following means.

(1) In heat developing sensitive material which has nonphotosensitivity silver salt, a photosensitive silver halide, and binder on a base material A latex of with a -30-degree-C or more glass transition temperature [40 degree-C or less] polymer is used as 50% of the weight or more of the binder of an image formation layer containing nonphotosensitive silver salt and a photosensitive silver halide. And heat developing sensitive material which has a kind and ***** for an organic-acid compound expressed with the following type (A) to a side which has an image formation layer at least and is characterized by the film surface pH by the side of an image formation layer being six or less.

[0014]

[Formula 4]

式 (A)



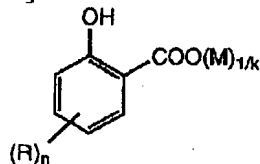
[0015] T expresses a univalent substituent among [type (A)], and k1 expresses or more 0 four or less integer. It expresses that the whole of k1=0 is a hydrogen atom, and in the case of k1 >=2, you may differ, even if the same, and may join together mutually, and two or more T may form the ring, respectively. L1 and L2 express a connection radical. n1 and n2 express or more 0 30 or less integer.]

(2) Heat developing sensitive material of the above (1) which ***** at least the compound further expressed with the following type (B) to the side which has an image formation layer.

[0016]

[Formula 5]

式 (B)



[0017] M expresses the cation of a hydrogen atom or k ** among [type (B)], and k expresses one or more integers. R expresses a substituent, n is the integer of 1-4, you may differ, even if the same, and it may join together mutually, and R of case plurality of n >=2 may form the ring.]

(3) The above (1) which uses ammonia for accommodation of a film surface pH at least, or (2) heat developing sensitive material.

(4) One heat developing sensitive material of above-mentioned (1) - (3) which is a kind of compound chosen from the substitute alkene derivative by which ***** is expressed with the following formula (1), the substitute isoxazole

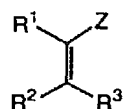
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for formula (3) at least.

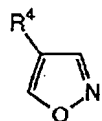
[0018]

[Formula 6]

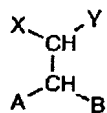
式 (1)



式 (2)



式 (3)



[0019] In [type (1), R₁, R₂, and R₃ express a hydrogen atom or a substituent independently, respectively, and Z expresses an electronic suction nature machine or a silyl radical. In a formula (1), it may join together mutually, respectively and R₂, R₃, R₁ and R₂, and R₃ and Z may form cyclic structure. [R₁, Z,] In a formula (2), R₄ express a substituent. In a formula (3), X and Y express a hydrogen atom or a substituent independently, respectively, and A and B express an alkoxy group, an alkylthio group, an alkylamino radical, an aryloxy group, an aryl thio radical, an ANIRINO radical, a heterocycle oxy-radical, a heterocycle thio radical, or the heterocycle amino group independent respectively. In a formula (3), it may join together mutually, respectively and X, Y, and A and B may form cyclic structure.]

[0020]

[Embodiment of the Invention] This invention is explained below at details. The latex of with a -30-degree-C or more glass transition temperature [40 degree-C or less] which makes possible as a main binder of the image formation la containing nonphotosensitivity silver salt and a photosensitive silver halide advantageous basin system spreading of good photograph engine performance in respect of environment and cost possible as for the heat developing sensitive material of this invention polymer is used. In such a sensitive material, by making the organic-acid compound and ***** which are expressed with a formula (A) contain, and making the film surface pH by the side of an image formation layer or less into 6.0, the engine performance as a high contrast sensitized material becomes good, and change of the engine performance by conservation can be prevented. Such an effect uses together further the compound expressed with a formula (B), and improves by using ammonia as alkali chemicals for accommodation of a film surface pH.

[0021] Although the organic silver salt which can be used for this invention as nonphotosensitivity silver salt is comparatively stable, when it is heated more than 80 degrees C or it to light under existence of the exposed photocatalysts (latent image of a photosensitive silver halide etc.) and a reducing agent, it is silver salt which forms a silver image. Organic silver salt may be the organic substance of arbitration including the source which can return complex ion. The silver salt (a carbon number 10-30, preferably 15-28) of an organic acid, especially the silver salt of long-chain fat carboxylic acid are desirable. The complex of organic [which has the complex stability constant of the range of 4.0-10.0], or inorganic silver salt also has a desirable ligand. Silver feed materials can constitute about 5 - 70% of the weight of an image formation layer preferably. Desirable organic silver salt contains the silver salt of the organic compound which has a carboxyl group. Although these examples contain the silver salt of aliphatic carboxyl acid, and the silver salt of aromatic carboxylic acid, they are not limited to these. As a desirable example of the silver salt of aliphatic carboxylic acid, behenic acid silver, arachidic acid silver, stearin acid silver, oleic acid silver, lauric-acid silver, caproic-acid silver, myristic-acid silver, palmitic-acid silver, maleic-acid silver, fumaric-acid silver, tartaric acid silver, linolic acid silver, butanoic acid silver and camphoric acid silver, such mixture, etc. are included.

[0022] In this invention, also in the mixture of the organic-acid silver mentioned above or organic-acid silver, it is desirable to use the organic-acid silver beyond behenic acid silver content 85 mol %, and more than 95 mol % is still more desirable. Behenic acid silver content shows the mole fraction of the behenic acid silver to the organic-acid silver to be used here. The object mentioned above as organic-acid silver other than the behenic acid silver contained in the organic-acid silver used for this invention can be used preferably.

[0023] The organic-acid silver preferably used for this invention is prepared by making the alkali-metal salt (Na salt, Li salt, etc. being mentioned) solution or the suspension, and the silver nitrate of the organic acid shown above react. The organic-acid alkali-metal salt of this invention is obtained by carrying out alkali treatment of the above-mentioned organic acid. The organic-acid silver of this invention is a palindromic type in the suitable container of arbitration, or continuous system can perform it. Churning in a reaction container can be agitated by the churning

method of arbitration with the property that a particle is required. as the method of preparation of organic-acid silver is in the reaction container containing organic-acid alkali-metal salting in liquid or suspension gradually about a silver-nitrate aqueous solution -- it is -- the method of adding rapidly -- it is in the reaction container containing a silver-nitrate aqueous solution gradually about the organic-acid alkali-metal salting in liquid or suspension prepared beforehand -- it is -- the method of adding rapidly -- any of the method of adding at coincidence the silver-nitrate aqueous solution prepared beforehand and organic-acid alkali-metal salting in liquid, or suspension in a reaction container -- although -- it can use preferably.

[0024] A silver-nitrate aqueous solution and organic-acid alkali-metal salting in liquid, or suspension can use the object of the concentration of arbitration for control of the grain size of the organic-acid silver to prepare, and can add it at addition speed of arbitration. As the addition method of a silver-nitrate aqueous solution and organic-acid alkali-metal salting in liquid, or suspension, it can add with the method of adding by addition speed regularity, the acceleration addition method by the time function of arbitration, or a moderation addition method. Moreover, to reaction mixture you may add on an oil level and may add in liquid. Although either a silver-nitrate aqueous solution, organic-acid alkali-metal salting in liquid or suspension can be made to be able to precede in the case of the method of adding at coincidence the silver-nitrate aqueous solution prepared beforehand and organic-acid alkali-metal salting in liquid, or suspension in a reaction container and it can also add in it, it is desirable to make a silver-nitrate aqueous solution precede and to add. As whenever [precedence], 0 to 50vol(s)% of the total addition is desirable, and especially 0 to 25vol(s)% is desirable. Moreover, the method of adding, while controlling pH or silver potential of reaction mixture under reaction like a publication to JP,9-127643,A etc. can also be used preferably.

[0025] The silver-nitrate aqueous solution, organic-acid alkali-metal salting in liquid, or suspension added can adjust pH with the property that a particle is required. The acid and alkali of arbitration can be added for pH adjustment. Moreover, although the temperature in a reaction container can be set as arbitration with the property that a particle is required, for control of the grain size of the organic-acid silver adjusted, for example, the silver-nitrate aqueous solution, organic-acid alkali-metal salting in liquid, or suspension added can also be adjusted to the temperature of arbitration. In order to secure the fluidity of liquid, as for organic-acid alkali-metal salting in liquid or suspension, it is desirable at 50 degrees C or more to carry out heating incubation.

[0026] As for the organic-acid silver used for this invention, being prepared under existence of tertiary alcohol is desirable. A 15 or less total carbon number object is preferably [as tertiary alcohol] desirable, and ten especially or less are desirable. As an example of desirable tertiary alcohol, although a tert-butanol etc. is mentioned, this invention is not limited to this.

[0027] Although which timing at the time of organic-acid silver adjustment is sufficient as the addition stage of the tertiary alcohol used for this invention, it is desirable to add at the time of preparation of an organic-acid alkali-metal salt, and to dissolve and use an organic-acid alkali-metal salt. Moreover, although the amount of the tertiary alcohol used of this invention can be used for arbitration in 0.01-10 by the weight ratio to H₂O as a solvent at the time of organic-acid silver preparation, the range of 0.03-1 is desirable.

[0028] Although there is especially no limit as a configuration of the organic silver salt which can be used for this invention, the needle crystal which has a minor axis and a major axis is desirable. In this invention, 0.20 micrometer or less of minor axes 0.01 micrometers or more and 5.0 micrometers or less of 0.10-micrometer or more major axes are desirable, and 0.15 micrometers or less of minor axes 0.01 micrometers or more and 4.0 micrometers or less of 0.10-micrometer or more major axes are more desirable. As for grain-size distribution of organic silver salt, it is desirable that it is mono dispersion. 100 molar fractions of the value which broke the standard deviation of the length of a minor axis and each major axis by the minor axis and each major axis are desirable, and mono dispersion is 50% or less still more preferably 80% or less more preferably 100% or less. As a measuring method of the configuration of organic silver salt, it can ask from the transmission electron microscope image of an organic silver salt distribution object. The percentage (coefficient of variation) of the value which there is a method of asking for the standard deviation of the volume weighted average diameter of organic silver salt as an option which measures mono dispersion nature, and is broken by the volume weighted average diameter is 50% or less still more preferably 80% or less more preferably 100% or less. Laser light is irradiated at the organic silver salt distributed for example, in liquid as a measuring method and it can ask from the grain size (volume weighted average diameter) obtained by asking for the autocorrelation function to time amount change of fluctuation of the scattered light.

[0029] Organic silver salt which can be used for this invention can be desalted preferably. Although there is especially no limit as a method of desalting and a well-known method can be used, the well-known filtration methods, such as flocculation rinsing by centrifugal filtration, suction filtration, the ultrafiltration, and the condensation method, can be used preferably.

[0030] It is desirable to use the variational method which carries out pressure drawdown at this invention, after changing the water dispersion which does not contain photosensitive silver salt substantially, including the organic silver salt which is image formation data medium in order to obtain the organic silver salt solid-state distribution object

which whose grain size is small at high S/N, and does not have condensation in the style of a high speed.

[0031] And after passing through such a production process, it mixes with a photosensitive silver salt aqueous solution and photosensitive image formation data-medium spreading liquid is manufactured. If heat developing sensitive material is produced using such spreading liquid, Hayes will be low and the heat developing sensitive material of high sensitivity will be obtained by low fogging. On the other hand, if it changes high pressure and in the style of a high speed, and photosensitive silver salt is made to live together when distributing, fogging will go up and sensitivity will fall remarkably. Moreover, if not water but an organic solvent is used as a dispersion medium, Hayes will become high fogging will go up and it will become easy for sensitivity to fall. On the other hand, it changes to the method of mixing a photosensitive silver salt aqueous solution, and if the conversion method for changing a part of organic silver salt into dispersion liquid into photosensitive silver salt is used, sensitivity will fall.

[0032] In the above, the water dispersion distributed by changing into high pressure and improvement in the speed is less than [0.1 mol %] to the organic silver salt of nonphotosensitivity [content / the] excluding photosensitive silver salt substantially, and addition of positive photosensitive silver salt is not performed.

[0033] About the solid-state distribution equipment used for enforcing the above variational methods in this invention and its technology for example, "a dispersed system rheology and decentralization technology" (Toshio in **, and Hiroki Usui work --) "1991, Shinzan Book Co., Ltd., p357-p403, and the 24th collection of an advance of chemical engineering" (the volume on corporation Society of Chemical Engineers, Japan Tokai branch --) Although it is detailed to 1990, Maki-Shoten Publishing, p184-p185, etc., the variational method in this invention After pressurizing the water distribution object which contains organic silver salt at least with high pressure pumping etc. and feeding in piping, is the method of performing detailed distribution, by passing the thin slit prepared in piping and making dispersion liquid produce a rapid pressure drop next.

[0034] The high-pressure homogenizer with which this invention is related is considered that distribution to a detailed particle is performed by dispersion force, such as "cavitation force" etc. produced in case "shearing force" and the (b) dispersoid which are generally produced in case the (a) dispersoid passes interval spare time at high pressure and a high speed are released from under high pressure by ordinary pressure. Although a Gaulin homogenizer is mentioned in ancient times as this kind of distributed equipment, with this equipment, the dispersion liquid fed sent with high pressure are a narrow gap on a cylinder side, it is changed in the style of a high speed, and collides with a surrounding wall surface with that vigor, and emulsification and distribution are performed by that impulse force. Generally, working pressure is 100-600kg/cm², the rate of flow is the range of several m - 30m/second, in order to gather distributed effectiveness, the high rate-of-flow section is made into the shape of a serrated knife, and what devised increasing the count of a collision etc. is devised. On the other hand, the equipment whose distribution by high pressure and the high rate of flow is recent years still attained is developed, and a Micro fluidizer (micro sieve DEKKUSU International corporation company), a nano mixer (special opportunity-ized Industry), etc. are mentioned as the example of representation.

[0035] as the distributed equipment suitable for this invention -- a micro sieve -- Micro fluidizer [by the DEKKUSU International corporation company] M-110 S-EH (with a G10Z interaction chamber), M-110Y (with an H10Z interaction chamber), M-140K (with a G10Z interaction chamber), HC-5000 (L30Z or with an H230Z interaction chamber), HC-8000 (E230Z or with an L30Z interaction chamber), etc. are mentioned.

[0036] After pressurizing the water dispersion which contains organic silver salt at least with high pressure pumping etc. using these equipments and feeding in piping, it is possible by making dispersion liquid produce rapid pressure drawdown by impressing a desired pressure and returning the pressure in piping to atmospheric pressure quickly next etc. to obtain the optimal organic silver salt distribution object for this invention by passing the thin slit prepared in piping.

[0037] It is desirable to carry out preliminary distribution of the raw material liquid in advance of distributed actualization. A distributed means (for example, a high speed mixer, a homogenizer, a high-speed impact mill, a Banbury mixer, a homomixer, a kneader, a ball mill, a vibration ball mill, a planet ball mill, attritor, a sand mill, a bead mill, a colloid mill, a jet mill, a roller mill, a TRON mill, a high-speed stone mill) well-known as a means which carries out preliminary distribution can be used. It rough-distributes in a solvent by carrying out pH control, and pH may be changed and may be made to atomize under existence of a distributed assistant after that also besides distributing mechanically. At this time, an organic solvent may be used as a solvent used for rough distribution, and an organic solvent is usually removed after atomization termination.

[0038] Although it is possible in organic silver salt distribution of this invention to distribute to a desired grain size by accommodation of the rate of flow, and the differential pressure at the time of pressure drawdown and the count of processing. The rate of flow from the point of a photograph property and grain size 200m/second - 600m/second The range whose differential pressure at the time of pressure drawdown is 900-3000kg/cm² is desirable, and it is still more desirable that the rate of flow is the range whose differential pressure at the time of 300m/second - 600m/[a second and] and pressure drawdown is 1500-3000kg/cm². Although the count of distributed processing can be chosen if

needed, and one - 10 times of the counts of processing are usually chosen, one - about 3 times of the counts of processing are chosen from the point of productivity. At an elevated temperature which exceeds 90 degrees C preferably from the point of dispersibility and a photograph property, making such a water dispersion into an elevated temperature under high pressure has the orientation for fogging to become high while grain size becomes easy to become large. Therefore, it is desirable still more desirable that the temperature of such moisture powder is maintained at the production process before changing into the aforementioned high pressure and the high rate of flow in this invention, the production processes after carrying out pressure drawdown, or both these production processes according to the cooling production process by the range of 5-90 degrees C including a cooling production process, and it is desirable the range of 5-80 degrees C and to be especially maintained at the range of 5-65 degrees C. Especially, at the time of high-pressure distribution of the range of 1500-3000kg/cm², it is effective to install the aforementioned cooling production process. A condenser can choose suitably what used the static mixer for the double pipe or the double pipe, a multitubular heat exchanger, a coil heat exchanger, etc. according to the amount of necessary heat exchange. Moreover, what is necessary is just to choose suitable things, such as a size, thickness, the quality of the material, etc. of a pipe, in consideration of working pressure, in order to gather the effectiveness of heat exchange. Refrigerants, such as -30-degree C ethylene glycol/water, can also be used for the refrigerant used for a condenser from the amount of heat exchange the 5-10-degree C cold water processed with the 20-degree C well water or the refrigerator, and if needed.

[0039] distributed actuation of this invention -- an aqueous solvent -- it is desirable to distribute organic silver salt under existence of a meltable dispersant (distributed assistant). As a distributed assistant, for example The copolymer of polyacrylic acid and an acrylic acid, Synthetic anion polymer, such as a maleic-acid copolymer, a maleic-acid monoester copolymer, and an AKURIRO methyl propane sulfonic-acid copolymer, Semisynthesis anion polymer, such as carboxymethyl starch and a carboxymethyl cellulose, Anionic polymer, such as an alginic acid and a pectic acid, a compound given in JP,7-350753,A, Or anionic [well-known], the Nonion nature, polyvinyl alcohol of a cationic surfactant or others, Although the high molecular compound which exists in nature, such as well-known polymer, such as a polyvinyl pyrrolidone, a carboxymethyl cellulose, hydroxypropylcellulose, and hydroxypropyl methylcellulose, gelatin, can be chosen suitably and can be used Polyvinyl alcohol and especially a water-soluble cellulosic are desirable.

[0040] Although it is a general method, mixing a distributed assistant with the powder of organic silver salt or the organic silver salt of a wet cake condition before distribution, and sending into a disperser as a slurry performs heat treatment and processing by the solvent, where organic silver salt is mixed beforehand, and it is good also as organic silver salt powder or a wet cake. pH control may be carried out with pH regulator suitably before and after distribution or during distribution.

[0041] It rough-distributes in a solvent by carrying out pH control, and pH may be changed and may be made to atomize under existence of a distributed assistant after that also besides distributing mechanically. At this time, an organic solvent may be used as a solvent used for rough distribution, and an organic solvent is usually removed after atomization termination.

[0042] The prepared distributed object can be saved, stirring in order to suppress sedimentation of the particle at the time of conservation, or can also be saved with hydrophilic colloid in the viscous high condition (for example, condition made into the shape of jelly using gelatin). Moreover, antiseptics can also be added in order to prevent propagation of the saprophytic bacteria at the time of conservation etc.

[0043] The grain size (volume weighted average diameter) of the organic silver salt solid-state particle distribution object of this invention irradiates laser light at the solid-state particle distribution object distributed for example, in liquid, and it can ask for it from the grain size (volume weighted average diameter) obtained by asking for the autocorrelation function to time amount change of fluctuation of the scattered light. A with an average grain size [0.1 micrometer or more / 10.0 micrometer or less] solid-state particle distribution object is desirable. It is 2.0 micrometer or less in average 0.1-micrometer or more grain size still more preferably more preferably average 0.1-micrometer or more grain size [5.0 micrometer or less].

[0044] As for grain-size distribution of organic silver salt, it is desirable that it is mono dispersion. Specifically, the percentage (coefficient of variation) of the value which broke the standard deviation of a volume weighted mean diameter by the volume weighted average diameter is 30% or less still more preferably 50% or less more preferably 80% or less.

[0045] As a measuring method of the configuration of organic silver salt, it can ask from the transmission electron microscope image of an organic silver salt distribution object.

[0046] The organic silver salt solid-state particle distribution object used for this invention consists of organic silver salt and water at least. Although especially the rate of organic silver salt and water is not limited, as for the rate of occupying to the organic whole silver salt, it is desirable that it is 5 - 50 % of the weight, and 10 - 30% of the weight its range is especially desirable. Although it is desirable to use the above-mentioned distributed assistant, it is desirable

to carry out critical mass use of the grain size in the range suitable for making it min, and 3 - 15% of the weight of a range is especially desirable one to 30% of the weight to organic silver salt.

[0047] although it is possible to mix an organic silver salt water dispersion and a photosensitive silver salt water dispersion in this invention, and to manufacture sensitive material -- the mixing ratio of organic silver salt and photosensitive silver salt -- the rate of photosensitive silver salt of as opposed to [although a rate can be chosen according to the purpose] organic silver salt -- the 1-30-mol range of % -- desirable -- further 3-20-mol % -- the 5-15 mol range of % is especially desirable. Mixing two or more sorts of organic silver salt water dispersions and two or more sorts of photosensitive silver salt water dispersions, in case it mixes is a method used preferably because of accommodation of a photograph property.

[0048] Although the organic silver salt of this invention can be used in a desired amount, 0.1 - 5 g/m² is 1 - 3 g/m² desirable still more preferably as a silver content.

[0049] It is desirable to add the metal ion chosen from calcium, Mg, Zn, and Ag to nonphotosensitivity organic silver salt to this invention. About the addition to the nonphotosensitivity organic silver salt of the metal ion chosen from calcium, Mg, Zn, and Ag, it is desirable to add in the form of the water-soluble metal salt which is not a halogenide, and specifically adding in forms, such as a nitrate and a sulfate, is desirable. Since the addition by the halogenide worsens the image shelf life by the light (indoor light, sunlight, etc.) of the sensitive material after processing, and the so-called print-out nature, it is not desirable. For this reason, it is desirable to add in this invention in the form of the water-soluble metal salt which is not the above-mentioned halogenide.

[0050] As an addition stage of the metal ion chosen from calcium, Mg, Zn, and Ag which are preferably used for this invention, if it is just before [, such as immediately after the particle formation after particle formation of this nonphotosensitivity organic silver salt, before distribution, after distribution, and spreading liquid adjustment order, spreading, which stage is sufficient and it is after distribution and before and after spreading liquid adjustment preferably.

[0051] As an addition of the metal ion chosen from calcium, Mg, Zn, and Ag in this invention, 10⁻³ to ten⁻¹ mol per one mol of nonphotosensitivity organic silver is desirable, and 5x10⁻³ to 5xten⁻¹ mol are especially desirable.

[0052] As a halogen presentation, especially a limit does not have the photosensitive silver halide used for this invention, and a silver chloride, a salt silver bromide, a silver bromide, iodine silver bromide, and a YAG salt silver bromide can be used for it. Distribution of the halogen presentation in a particle may be uniform, and that from which the halogen presentation changed in the shape of a step may be used for it, or what changed continuously may be used for it. Moreover, the silver halide particle which has a core/shell structure can be used preferably. as structure -- desirable -- 2-5-fold structure -- the core / shell particle of 2-4-fold structure can be used more preferably. Moreover, the technology to which localization of the silver bromide is carried out can also be preferably used for the surface of silver chloride or a salt silver-bromide particle.

[0053] Although the formation method of a photosensitive silver halide can use the method which is learned well, for example, is indicated by No. 17029 and U.S. Pat. No. 3,700,458 in research disclosure June, 1978 in this industry, by specifically adding a silver supply compound and a halogen supply compound in gelatin or other polymer solutions, photosensitive silver halide is prepared and the method of mixing with organic silver salt after that is used. It is desirable that it is small for the purpose which suppresses the nebula after image formation low, and the grain size of photosensitive silver halide specifically has more preferably 0.02 micrometers or more still more preferably good 0.1 micrometers or less 0.01 micrometers or more 0.15 micrometers or less 0.20 micrometers or less. A grain size here means the length of $\sqrt[3]{V}$ of a silver halide particle, when a silver halide particle is the so-called normal $\sqrt[3]{V}$ of a cube or octahedron. Moreover, when a silver halide particle is a plate-like particle, the diameter when converting into the circle image of the projected area on the surface of main and this area is said. In addition, when it is not normal $\sqrt[3]{V}$, in the case of a spherical particle, a cylindrical particle, etc., the diameter when considering a ball equivalent to the volume of a silver halide particle is said.

[0054] Although a cube, octahedron, plate-like particle, spherical particle, cylindrical particle, and potato-like particle etc. can be mentioned as a configuration of a silver halide particle, especially in this invention, a cube-like particle and a plate-like particle are desirable. the average aspect ratio in the case of using a plate-like silver halide particle -- desirable -- 100:1-2:1 -- 50:1-3:1 are more preferably good. Furthermore, the particle to which the corner of a silver halide particle was round can also be used preferably. Although there is especially no limit about the indices of crystal plane (Miller indices) of the outside surface of a photosensitive silver halide particle, it is desirable that the rate that {100} sides where spectral sensitization effectiveness when spectral sensitization coloring matter adsorbs is high occupy is high. As the rate, 50% or more is desirable, 65% or more is more desirable, and 80% or more is still more desirable. T.Tani;J.Imaging Sci. using the adsorption dependency of the {111} sides and {100} sides in adsorption of sensitizing dye and 29,165 (1985) can be asked for the ratio of a Miller-indices {100} side by the method of a publication.

[0055] the photosensitive silver halide particle of this invention -- the [of the periodic table] -- the [a VII group or]

a VIII group's (seven to 10 group) metal or metal complex is contained. the [of the periodic table] -- the [a VII group or] -- they are a rhodium, a rhenium, a ruthenium, male NIUMU, and iridium preferably as a VIII group's metal, or a central metal of a metal complex. The number of these metal complexes one, and they may use together two or more sorts of complexes of a metal of the same kind and a dissimilar metal. Desirable content has the desirable range of 1xten - nine to 1xten - three mols to one mol of silver, and its range of 1xten - eight to 1xten - four mols is more desirable. The metal complex of the structure indicated by JP,7-225449,A etc. as structure of a concrete metal compl can be used.

[0056] A water-soluble rhodium compound can be used as a rhodium compound used for this invention. For example what has a halogen, amines, oxalato, etc. as a ligand with a halogenation rhodium (III) compound or rhodium complex salt, for example, hexa chloro rhodium (III) complex salt, pen TAKURORA collodium (III) complex salt, tetra-chl IIAKO rhodium (III) complex salt, hexa BUOMO rhodium (III) complex salt, hexa ammine rhodium (III) complex salt, trio KIZARATO rhodium (III) complex salt, etc. are mentioned. Although dissolved and used for water or a suitable solvent, the method of adding the method (for example, a hydrochloric acid, bromate, fluoric acid, etc.) generally performed often, i.e., hydrogen halide aqueous solutions, and alkali halides (for example, KCl, NaCl, KBr, NaBr, etc.) can be used for these rhodium compounds in order to stabilize the solution of a rhodium compound. It is possible to add another silver halide particle which has doped the rhodium beforehand, and to also make it dissolve at the time of silver halide preparation instead of using a water-soluble rhodium.

[0057] The range of 1xten - eight mols - 5xten - four mols per one mol of silver halides is desirable especially desirable, and the addition of these rhodium compounds is 5xten - eight mols - 1xten - five mols.

[0058] Although addition of these compounds can be suitably performed in each phase before applying the time of manufacture of a silver halide emulsion particle, and an emulsion, it is desirable to add especially at the time of emulsion formation, and to be incorporated into a silver halide particle.

[0059] The rhenium used for this invention, a ruthenium, and an osmium are added in the form of the water-soluble complex salt indicated by JP,63-2042,A, JP,1-285941,A, 2-20852, 2-20855, etc. The sixcoordinate complex especial shown by the following formulas as a desirable thing is mentioned.

[ML6] n - M expresses Ru, Re, or Os here, L expresses a ligand, and n expresses 0, 1, 2, 3, or 4.

[0060] In this case, a counter ion does not have importance but ammonium or alkali-metal ion is used.

[0061] Moreover, as a desirable ligand, a halogenide ligand, a cyanide ligand, a cyanic-acid ghost ligand, a nitrosyl ligand, a thio nitrosyl ligand, etc. are mentioned. Although the example of the concrete complex used for this invention below is shown, this invention is not limited to this.

[0062]

[ReCl₆]³⁻- [ReBr₆]³⁻- [ReCl₅(NO)]²⁻-[Re(NS)Br₅]²⁻- [Re(NO)(CN)₅]²⁻- [Re(O)₂(CN)₄]³⁻-[RuCl₆]³⁻- [RuCl₄(H₂O)₂]- [RuCl₅(H₂O)]²⁻-[RuCl₅(NO)]²⁻- [RuBr₅(NS)]²⁻-[Ru(CO)₃Cl₃]²⁻- [Ru(CO)Cl₅]²⁻- [Ru(CO)Br₅]²⁻-[OsCl₆]³⁻- [OsCl₅(NO)]²⁻- [Os(NO) (CN)₅]²⁻-[Os(NS) Br₅]²⁻- [Os(O)₂(CN)₄]⁴⁻-[0063] The range of 1xten - nine mols - 1xten - four mols per one mol of silver halides is desirable especially desirable, and the addition of these compounds is 1xten - eight mols - 1xten - five mols.

[0064] Although addition of these compounds can be suitably performed in each phase before applying the time of manufacture of a silver halide emulsion particle, and an emulsion, it is desirable to add especially at the time of emulsion formation, and to be incorporated into a silver halide particle.

[0065] In order to add these compounds during particle formation of a silver halide and to incorporate into a silver halide particle The aqueous solution which dissolved together with the powder of a metal complex or NaCl, and KCl How to add in the water-soluble salt under particle formation, or the water-soluble halide solution, Or when a halide solution is mixed with silver salt by coincidence, it adds as the 3rd solution, and there is a method of preparing a silver halide particle by the method of 3 liquid coincidence mixing or the method of feeding the aqueous solution of the metal complex of an initial complement into a reaction container during particle formation. The method of adding the aqueous solution which dissolved together with especially powder or NaCl, and KCl in a water-soluble halide solution is desirable.

[0066] In order to add on the particle surface, the aqueous solution of the metal complex of an initial complement can also be fed into a reaction container at the time in the middle of the time of physical aging immediately after particle formation of termination or chemical ripening.

[0067] Although various things can be used as an iridium compound used by this invention, hexa chloro iridium, hexa ammine iridium, trio KIZARATO iridium, hexa cyano iridium, PENTA chloro nitrosyl iridium, etc. are mentioned, for example. Although dissolved and used for water or a suitable solvent, the method of adding the method (for example hydrochloric acid, bromate, fluoric acid, etc.) generally performed often, i.e., hydrogen halide aqueous solutions, and alkali halides (for example, KCl, NaCl, KBr, NaBr, etc.) can be used for these iridium compounds in order to stabilize the solution of an iridium compound. It is possible to add another silver halide particle which has doped iridium beforehand, and to also make it dissolve at the time of silver halide preparation instead of using water-soluble iridium

[0068] To the silver halide particle furthermore used for this invention, metal atoms, such as cobalt, iron, nickel, chromium, palladium, platinum, gold, a thallium, copper, and lead, may be contained. About the compound of a ruthenium, a 6 cyano metal complex can be preferably used for cobalt, iron, chromium, and a pan. As an example, although ferricyanic acid ion, ferrocyanic acid ion, hexa cyano cobalt acid ion, hexa cyano chromic-acid ion, hexa cyano ruthenium acid ion, etc. are mentioned, it is not limited to these. Even if it makes homogeneity contain the me complex in a silver halide, the core section may be made to contain in high concentration, or the shell section may be made to contain in high concentration, and there is especially no limit.

[0069] The above-mentioned metal has desirable 1×10^{-9} to 1×10^{-1} - four mols per one mol of silver halides. moreover the above-mentioned metal is contained -- making -- it can be made simple salt, double salt, or the metal salt of the form of complex salt, and can add at the time of particle preparation.

[0070] Although the noodle method, the flocculation method, etc. can be desalted by rinsing of the method learned f this industry, even if a photosensitive silver halide particle desalts them in this invention, it is not necessary to carry it.

[0071] As a gold sensitization agent used when giving gold sensitization to the silver halide emulsion of this inventio + univalent or + trivalent are sufficient as the golden oxidation number, and the gold compound usually used as a go sensitization agent can be used. As a typical example, chlorauric acid, a potassium clo ROO rate, auric trichloride, potassium Auric thiocyanate, a potassium yaw DOO rate, tetracyano ORIKKU acid, ammonium aurothiocyanate, pyridyltrichlorogold, etc. are mentioned.

[0072] Although the addition of a gold sensitization agent changes with various conditions, as a standard, ten - seven mols or more per one mol of silver halides ten - three mols or less are 5×10^{-1} to four or less [ten - six mols or more] more preferably.

[0073] As for the silver halide emulsion of this invention, it is desirable to use together gold sensitization and other chemical sensitization. As the method of other chemical sensitization, methods learned, such as a sulfur sensitization method, a selenium sensitization method, a tellurium sensitization method, and a noble-metals sensitization method, can be used. When using it combining a gold sensitization method, for example, a sulfur sensitization method, a gold sensitization method and a selenium sensitization method, a gold sensitization method and a sulfur sensitization method, a selenium sensitization method, a gold sensitization method and a sulfur sensitization method, a tellurium sensitization method, a gold sensitization method and a sulfur sensitization method, a selenium sensitization method, a gold sensitization method and a sulfur sensitization method, a tellurium sensitization method, a gold sensitization method and a sulfur sensitization method, a selenium sensitization method, etc. are desirable.

[0074] The sulfur sensitization preferably used for this invention adds a sulfur sensitization agent, and is usually performed by carrying out fixed time amount churning of the emulsion at an elevated temperature 40 degrees C or more. Thiourea, others and various sulfur compounds, for example, a thiosulfate, thiazoles, and rhodanine can be use [sulfur compound / which can use a compound well-known as a sulfur sensitization agent, for example is contained gelatin] Desirable sulfur compounds are a thiosulfate and a thiourea compound. Although the addition of a sulfur sensitization agent changes under various conditions, such as magnitude of pH at the time of chemical ripening, temperature, and a silver halide particle, it is 10^{-7} to ten - two mols per one mol of silver halides, and is 10^{-5} to ten - three mols more preferably.

[0075] A well-known selenium compound can be used as a selenium sensitizer used for this invention. That is, it is carried out by adding an unstable mold and/or an un-unstable mold selenium compound, and usually carrying out fix time amount churning of the emulsion at an elevated temperature 40 degrees C or more. The compound of a publicat can be used for JP,44-15748,B, 43-13489, JP,4-25832,A, 4-109240, 4-324855, etc. as an unstable mold selenium compound. It is especially a general formula (VIII) in JP,4-324855,A. And it is desirable to use the compound shown by (IX).

[0076] It is the compound which makes the tellurium-ized silver presumed that the tellurium sensitizer used for this invention becomes a sensitization nucleus to the silver halide particle surface or the interior generate. About the tellurium-ized silver generation rate in a silver halide emulsion, it can examine by the method of a publication to JP,5 313284,A. As a tellurium sensitizer, for example, diacyl telluride and screw (oxy-carbonyl) telluride, Screw (carbamoyl) telluride, diacyl telluride, a bis(oxy carbonyl)ditelluride group, A bis(carbamoyl)ditelluride group, the compound which has P=Te association, TERURO carboxylate, Te-organil tellurocarboxylic-ester, JI (Pori) telluride, telluride, TERURORU, TERURO acetals, a tellurosulfonate group, the compound that has P-Te association, ** Te heterocycles, a TERURO carbonyl compound, an inorganic tellurium compound, a colloid tellurium, etc. can be used Specifically U.S. Pat. No. 1,623,499, 3,320,069, 3,772,031, the British patent No. 235,211, 1,121,496, 1,295,462, 1,396,696, the Canada patent No. 800,958, JP,4-204640,A, Japanese Patent Application No. No. 53693 [three to], 3 131598, 4-129787 and journal OBU chemical SOSAIA tea chemical communication (J. Chem.Soc.Chem.Comm.) 535 (1980) -- ibid 1102 (1979) ibid 645 (1979), a journal OBU chemical SOSAIA tea Perkin transaction (J. Chem.Soc.Perkin.Trans.) -- 1 and 2191 (1980) -- S. Edited by Patai (S. Patai) and THE chemistry OBU organic selenium - and - tellurium contribution UNZU (The Chemistry of Organic Serenium and Tellunium Compounds),

V. 1 (1986), ** The compound of a publication can be used for Vol.2 (1987). The general formula (II) which is especially among JP,5-313284,A, (III), and (IV) The compound shown is desirable.

[0077] Although the amount of the selenium used by this invention and the tellurium sensitizer used changes according to a silver halide particle, chemical-ripening conditions, etc. to be used, generally 10-8 to ten - two mols [per one mol of silver halides] about 10-7 to ten - three mols are preferably used for it. although there is especially no limit as conditions for the chemical sensitization in this invention -- as pH -- as 5-8, and pAg -- 6-11 -- it is 7-10 preferably a 40-95 degrees C is 45-85 degrees C preferably as a temperature.

[0078] Cadmium salt, a sulfite, lead salt, thallium salt, etc. may be made to live together in the process of formation a silver halide particle, or physical aging in the silver halide emulsion used for this invention.

[0079] Reduction sensitization can be used in this invention. As a concrete compound of a reduction sensitization method, a stannous chloride, aminoiminomethanesulfonic acid, a hydrazine derivative, a borane compound, a silane compound, a polyamine compound, etc. can be used other than an ascorbic acid and a thiourea dioxide. Moreover, reduction sensitization of the pH of an emulsion can be carried out by holding and riping 7 or more and pAg or less t 8.3. Moreover, reduction sensitization can be carried out by introducing the single addition part of complex ion during particle formation.

[0080] The silver halide emulsion of this invention may add a thiosulfonic acid compound by the method shown in t Europe public presentation patent EP No. 293,917.

[0081] the silver halide emulsion in the sensitive material used for this invention -- a kind -- good -- two or more (for example, that [from which average grain size differs], thing [from which a halogen presentation differs], thing [for which crystal habit differs], thing from which conditions of chemical sensitization differ) sort concomitant use may be carried out and carried out.

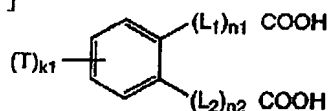
[0082] As amount of the photosensitive silver halide used of this invention, 0.5 mols or less of photosensitive 0.01-m or more silver halides are desirable to one mol of organic silver salt, 0.02 mols or more 0.3 mols or less are more desirable, and 0.03 mols or more especially 0.25 mols or less are desirable. About the mixed method of the photosensitive silver halide prepared separately and organic silver salt, and mixed conditions The silver halide particle and the organic silver salt which carried out preparation termination, respectively A high-speed agitator and a ball mill the method of mixing with a sand mill, a colloid mill, a vibration mill, a homogenizer, etc. -- or, although there is a method of mixing the photosensitive silver halide which carried out preparation termination to the timing of either of preparation of organic silver salt, and preparing organic silver salt etc. In the limitation which fully appears, especially a limit does not have the effect of this invention.

[0083] The heat developing sensitive material of this invention carries out kind content of the organic-acid compound expressed with the layer of the side which has an image formation layer by the following formula (A) at least.

[0084]

[Formula 7]

式 (A)



[0085] T expresses a univalent substituent among a formula (A), and k_1 expresses or more 0 four or less integer. It expresses that the whole of $k_1=0$ is a hydrogen atom, and in the case of $k_1 \geq 2$, you may differ, even if the same, and may join together mutually, and two or more T may form the ring, respectively. When two or more T does not form ring mutually, as for k_1 , 0, 1, or 2 are desirable, and 0 or especially 1 are desirable.

[0086] as the univalent substituent expressed with T -- an alkyl group (they are carbon numbers 1-8 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-12 --) for example, methyl, ethyl, n-propyl, iso-propyl, n-butyl, iso-butyl, tert-butyl, n-octyl, n-DESHIRU, n-hexadecyl, cyclo propyl, cyclopentyl, cyclohexyl, etc. are mentioned. an alkenyl radical (they are carbon numbers 2-8 especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- carbon numbers 2-12 --) for example, vinyl, an allyl compound, 2-butenyl, 3-pentenyl, etc. are mentioned. an alkynyl group (especially, it is 2-8 preferably, for example, propargyl, 3-benchnil etc. are mentioned. desirable -- carbon numbers 2-20 -- more -- desirable -- 2-12 --) an aryl group (especially, it is carbon numbers 6-12 preferably, for example, phenyl, p-methylphenyl, naphthyl, etc. are mentioned. desirable -- carbon numbers 6-30 -- more -- desirable -- carbon numbers 6-20 --) the amino group (they are carbon numbers 0-6 especially preferably desirable -- carbon numbers 0-20 -- more -- desirable -- carbon numbers 0-10 --) for example, amino, methylamino, dimethylamino, diethylamino, dibenzylamino, etc. are mentioned. an alkoxy group (especially carbon numbers 1-8 preferably, for example, methoxy and ethoxy ** isopropoxy, butoxy one, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-12 --) an aryloxy group (they are carbon numbers 6-12 especially preferably desirable -- carbon numbers 6-20 -- more -- desirable -- carbon numbers 6-16 --) for example, phenyloxy, 2-naphthyloxy, etc. are mentioned. an acyl group (especially, it is carbon numbers 1-12

preferably, for example, acetyl, benzoyl, the formyl, pivaloyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) an alkoxy carbonyl group (they are carbon numbers 2-12 especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- carbon numbers 2-16 --) for example, methoxycarbonyl, ethoxycarbonyl, tetradecyl oxy-carbonyl, etc. are mentioned. an aryloxy carbonyl group (especially it is carbon numbers 7-10 preferably, for example, phenyloxy carbonyl etc. is mentioned. desirable -- carbon number 7-20 -- more -- desirable -- carbon numbers 7-16 --) an acyloxy radical (they are carbon numbers 2-10 especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- carbon numbers 2-16 --) for example, acetoxo, benzoyloxy one, etc. are mentioned. the acylamino radical (especially, it is carbon numbers 2-10 preferably, for example, acetylamino, propionylamino, benzoylamino, etc. are mentioned. desirable -- carbon numbers 2-20 -- more -- desirable -- carbon numbers 2-16 --) an alkoxycarbonylamino radical (they are carbon numbers 2-12 especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- carbon numbers 2-16 --) for example, methoxycarbonylamino etc. is mentioned. an aryloxycarbonylamine radical (especially, it is carbon numbers 7-12 preferably, for example, phenyloxy carbonylamino etc. is mentioned. desirable -- carbon numbers 7-20 -- more -- desirable -- carbon numbers 7-16 --) a sulfonylamino radical (they are carbon numbers 1-12 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) for example, methanesulfonylamino octane sulfonylamino, benzenesulphonyl amino, etc. are mentioned. a sulfamoyl group (especially, it is carbon number 0-12 preferably, for example, sulfamoyl, methyl sulfamoyl, dimethyl sulfamoyl, phenyl sulfamoyl, etc. are mentioned. desirable -- carbon numbers 0-20 -- more -- desirable -- carbon numbers 0-16 --) a carbamoyl group (they are carbon numbers 1-12 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) example, carbamoyl, methyl carbamoyl, diethylcarbamoyl, phenylcarbamoyl, etc. are mentioned. an alkylthio group (especially, it is carbon numbers 1-12 preferably, for example, a methylthio, ethyl thio, etc. are mentioned. desirable carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) an aryl thio radical (they are carbon numbers 6- especially preferably desirable -- carbon numbers 6-20 -- more -- desirable -- carbon numbers 6-16 --) for example, phenylthio etc. is mentioned. a sulfonyl group (especially, it is carbon numbers 1-12 preferably, for example, mesyl, tosyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) a sulfinyl group (especially, it is carbon numbers 1-12 preferably, for example, methane sulfinyl, benzene sulfinyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) an ureido radical (they are carbon numbers 1-12 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) for example, ureido, methyl ureido, phenyl ureido, etc. are mentioned. a phosphoric-acid amide group (especially, it is carbon numbers 1-12 preferably, for example, a diethyl phosphoric-acid amide, a phenyl phosphoric acid amide, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- carbon numbers 1-16 --) A hydroxy group, a cull POKISHIRU radical, a sulfonic group, a SURUFINO radical (sulfinic-acid radical), A sulphyd group, a halogen atom (for example, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom), a cyano group, a nitro group, a hydroxamic acid radical, a hydrazino radical, a heterocycle radical (for example, imidazolyl, pyridyl furil, PI ** RIJIRU, morpholino, etc. are mentioned.) etc. -- it is mentioned. Moreover, as an example in which two or more T joins together mutually, and forms the ring, although what kind of known condensed ring phthalic acid can be used, as a desirable example, [3, 4] benzo, [4, 5] benzo, [4, 5] naphth, [3, 4] methylene dioxy (namely, JIOKISORO), [4, 5] methylene dioxy, etc. can be mentioned. Moreover, the substituent in which salt formation with alkali metal etc. is possible may form the salt. These substituents or condensed rings may be replaced further. moreover, in a certain case, even if two or more substituents are the same, they may differ.

[0087] Preferably as a substituent expressed with T An alkyl group, an alkenyl radical, an aryl group, An alkoxy group, an aryloxy group, an acyl group, an acyloxy radical, an alkoxy carbonyl group, The acylamino radical, an alkoxycarbonylamino radical, an aryloxycarbonylamine radical, A sulfonylamino radical, a sulfamoyl group, a carbamoyl group, an ureido radical, A phosphoric-acid amide group, a hydroxy group, a cull POKISHIRU radical, a sulfonic group, a SURUFINO radical, a sulfonyl group, a halogen atom, a cyano group, and a nitro group -- passing terrorism ring machine and [3, 4] benzo -- [4, 5] benzo, [4, 5] naphth, [3, 4] methylene dioxy, It is [4, 5] methylene dioxy. Still more preferably An alkyl group, an aryl group, An alkoxy group, an aryloxy group, an acyl group, the acylamino radical, a sulfonylamino radical, A sulfamoyl group, a carbamoyl group, a hydroxy group, a sulfonyl group, a halogen atom and a cyano group -- it is -- [3, 4] benzo, [4, 5] benzo, [3, 4] methylene dioxy, and [4, 5] methylene dioxy -- they are an alkyl group, an aryl group, an alkoxy group, [4, 5] benzo, and [4, 5] methylene dioxy especially preferably.

[0088] L1 and L2 express a connection radical. The connection radical expressed with L1 and L2 is a connection radical of the bivalence of the length for 1 thru/or 4 atoms preferably, and may have the substituent further. As a desirable example, -CH2-, -CH2CH2-, -C(=O)-, -CONH-, and -SO2NH- can be mentioned.

[0089] n1 and n2 express or more 0 30 or less integer. A combination desirable as L1, L2, and n1 and n2 It is desirable that it is 0 thru/or 10 as n1 and n2 when L1 and L2 express the connection radical of the length of 0 thru/or 2 atoms, and when L1 and L2 express the connection radical of the length of 3 thru/or 4 atoms, it is desirable that it is 0 thru/o

as n1 and n2. As a combination of L1, L2, and n1 and n2, L1 and L2 express the connection radical of the length of 0 thru/or 2 atoms, and it is still more desirable that it is 0 thru/or 6 as n1 and n2. Especially the thing for which L1 and express -CH2-, -CH2CH2-, -C(=O)-, -CONH-, and -SO2NH-, and n1 and n2 express 0 thru/or 2 as a combination of L1, L2, and n1 and n2 is desirable.

[0090] It III(s). the compound expressed with the formula (A) of this invention -- for example, new experimental science lecture (Maruzen) 14- Chapter 5 -1, Organic Functional Group Preparations of Chapter I-9 (Academic Press New York and London), Tetrahedron, 31 volumes (20), 2607 - 19 pages (1975), Angewante According to the metho of a publication, it is compoundable in the reference quoted by Chem.86 volume (9), 349 pages (1974), and these. Moreover, a commercial compound may be used.

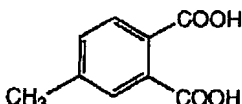
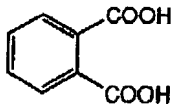
[0091] Although the example of an organic-acid compound expressed with a formula (A) below is given, this invent is not limited to these.

[0092]

[Formula 8]

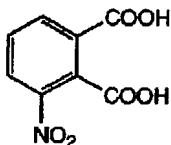
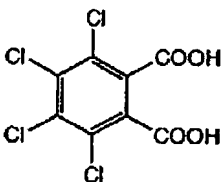
A - 1

A - 2



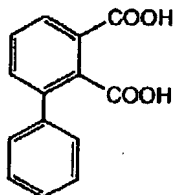
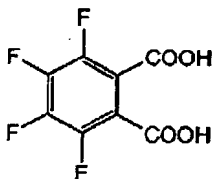
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A - 4



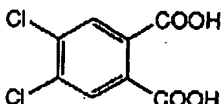
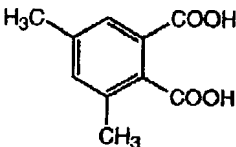
A - 5

A - 6



A - 7

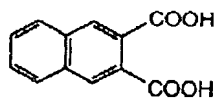
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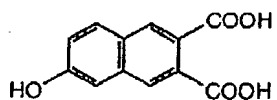
[0093]

[Formula 9]

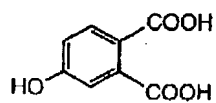
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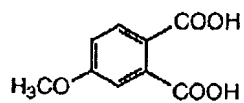
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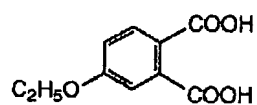
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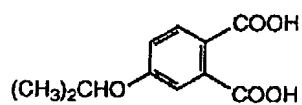
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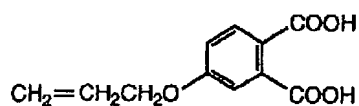
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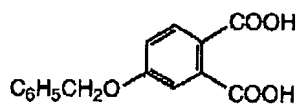
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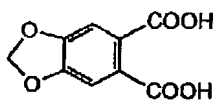
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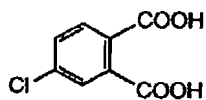
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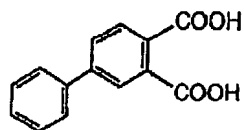
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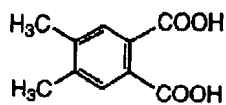
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A-19



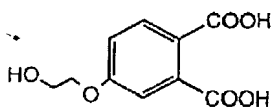
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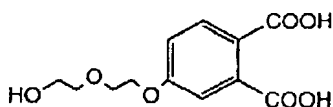
[0094]

[Formula 10]

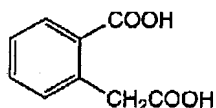
A - 2 1



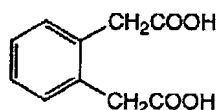
A - 2 2



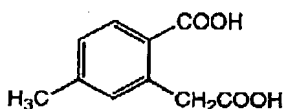
A - 2 3



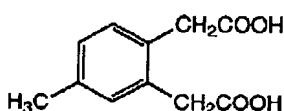
A - 2 4



A - 2 5



A - 2 6



[0095] The addition of the compound expressed with a formula (A) has ten - four mols - desirable ten mols per one m of Ag, and further ten - three mols - its one mol is desirable. Moreover, the compound expressed with a formula (A) may use two or more sorts together, using only a kind.

[0096] The compound expressed with the formula (A) of this invention may be added by what kind of methods, such a solution, powder, and a solid-state particle distribution object. Solid-state particle distribution is performed by well known detailed-sized means (for example, , a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a ro mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0097] The compound expressed with the formula (A) of this invention can be added in the layer by the side of the image formation layer of sensitive material, for example, the photosensitive layer which can turn into an image formation layer, and the nonphotosensitivity layer by the side of this layer.

[0098] The film surface pH before heat developing processing of the heat developing sensitive material of this invention is six or less, and is 5.3 or less still more preferably 5.5 or less preferably. It is about three although there is especially no limit in the minimum.

[0099] As for accommodation of a film surface pH, it is desirable to use volatile bases, such as an acid of the non-volatile of an organic acid, a sulfuric acid, etc. expressed with the aforementioned formula (A) and ammonia, from a viewpoint of reducing a film surface pH.

[0100] Especially ammonia is desirable when attaining the low film surface pH, since it is easy to volatilize, and it is removable before heat developing is carried out, the production process to apply and.

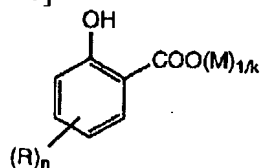
[0101] In addition, measurement of the film surface pH of this invention folds heat developing sensitive-material 2.5cmx2.5cm before heat developing processing in boat form, and is 300microl to the image formation layer side. After dropping distilled water and putting it for 30 minutes, it is pH about the dropping liquid. It carried out by measuring 1 minute by BOY-P2 (pH meter of the Shindengen Electric Mfg. Co., Ltd. make and a semiconductor method).

[0102] The heat developing sensitive material of this invention is desirable when reducing fogging at the time of conservation of the heat developing sensitive material that whose kind content of the compound expressed with the layer of the side which has an image formation layer by the following formula (B) is carried out at least it is the purpose of this invention.

[0103]

[Formula 11]

式 (B)



[0104] In a formula (B), M expresses the cations (for example, ammonium ion, such as metal ions, such as sodium ion, potassium ion, calcium ion, barium ion, and zinc ion, tetramethyl ammonium ion, and tetrabutyl ammonium ion etc

of a hydrogen atom or k^{**} . k is one or more integers, as the ion illustrated shows, and it is usually 1 or 2. Moreover, is $k=1$ when M is a hydrogen atom.

[0105] a formula (B) -- setting -- R -- a substituent -- expressing -- for example, a straight chain, branching, or an annular alkyl group (it is 1-8 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- 1-12 --) for example, methyl, ethyl, iso-propyl, t-butyl, n-octyl, 1, 1 and 3, 3-tetramethylbutyl, t-amyl, cyclohexyl, etc. are mentioned. an alkenyl radical (especially, it is 2-8 preferably, for example, vinyl, an allyl compound, 2-butenyl, 3-pentenyl, etc. are mentioned. desirable -- carbon numbers 2-20 -- more -- desirable -- 2-12 --) an alkynyl group (it is especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- 2-12 --) for example, propargyl, 3-cutting-pliers nil, etc. are mentioned. an aralkyl radical (especially, it is 7-16 preferably, for example, benzyl, alpha-methylbenzyl, alpha-ethyl benzyl, diphenyl methyl, naphthyl methyl, naphthyl phenylmethyl, etc. are mentioned. desirable -- carbon numbers 7-30 -- more -- desirable -- 7-20 --) an aryl group (it is 6-12 especially preferably desirable -- carbon numbers 6-30 -- more -- desirable -- 6-20 [] --) for example, phenyl, p-methylphenyl, naphthyl, etc. are mentioned. the amino group (it is 0-6 still more preferably, for example, amino, methylamino, dimethylamino, diethylamino, dibenzylamino, etc. are mentioned. desirable -- carbon numbers 0-20 -- more -- desirable -- 0-10 --) an alkoxy group (it is 1-8 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- 1-12 --) for example, methoxy and ethoxy ** butoxy etc. is mentioned. an aryloxy group (especially, it is 6-12 preferably, for example, phenyloxy, 2-naphthyloxy, etc. are mentioned. desirable -- carbon numbers 6-20 -- more -- desirable -- 6-12 --) an acyl group (especially, it is 1-12 preferably, for example, acetyl, benzoyl, the formyl, pivaloyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) an alkoxy carbonyl group (it is 2-12 especially preferably desirable -- carbon numbers 2-20 -- more -- desirable -- 2-16 --) for example, methoxycarbonyl, ethoxycarbonyl, etc. are mentioned. an aryloxy carbonyl group (especially, it is 7-10 preferably, for example, phenoxycarbonyl etc. is mentioned. desirable -- carbon numbers 7-20 -- more -- desirable -- 7-16 --) an acyloxy radical (especially, it is 2-10 preferably, for example, acetoxyl, benzoyloxyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 2-16 --) the acylamino radical (it is 2-10 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- 2-16 --) for example, acetylamino, benzoylamino, etc. are mentioned. an alkoxy carbonylamino radical (especially, it is 2-12 preferably, for example, methoxycarbonylamino etc. is mentioned. desirable -- carbon numbers 2-20 -- more -- desirable -- 2-16 --) an aryloxy carbonylamino radical (especially, it is 7-10 preferably, for example, phenyloxy carbonylamino etc. is mentioned. desirable -- carbon numbers 7-20 -- more -- desirable -- 7-16 --) a sulfonylamino radical (it is 1-12 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) for example, methanesulfonylamino, benzenesulfonyl amino, etc. are mentioned. a sulfamoyl group (especially, it is 0-12 preferably, for example, sulfamoyl, methyl sulfamoyl, dimethyl sulfamoyl, phenyl sulfamoyl, etc. are mentioned. desirable -- carbon numbers 0-20 -- more -- desirable -- 0-16 --) a carbamoyl group (it is 0-12 especially preferably desirable -- carbon numbers 0-20 -- more -- desirable -- 0-16 --) for example, carbamoyl, diethylcarbamoyl, phenylcarbamoyl, etc. are mentioned. an ureido radical (especially, it is 1-12 preferably, for example, ureido, methyl ureido, phenyl UREI, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) an alkylthio group (especially, it is 1-12 preferably, for example, a methylthio, ethyl thio, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) an aryl thio radical (it is 6-12 especially preferably desirable -- carbon numbers 6-20 -- more -- desirable -- 6-16 --) for example, phenylthio etc. is mentioned. a sulfonyl group (especially, it is 1-12 preferably, for example, mesyl, tosyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) a sulfinyl group (especially, it is 1-12 preferably, for example, methane sulfinyl, benzene sulfinyl, etc. are mentioned. desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) a phosphoric acid amide group (it is 1-12 especially preferably desirable -- carbon numbers 1-20 -- more -- desirable -- 1-16 --) for example, a diethyl phosphoric acid amide, a phenyl phosphoric acid amide, etc. are mentioned. a hydroxy group, a sulfhydryl group, and a halogen atom (for example, a fluorine atom --) A chlorine atom, a bromine atom, an iodine atom, a cyan group, a sulfonic group, a carboxy group, A nitro group, a hydronalium KISAMU radical, a SURUFINO radical, a hydrazino radical, a sulfonyl thio radical, a thio sulfonyl group, a heterocycle radical (for example, imidazolyl, pyridyl, furil, piperidyl, MORIHORIRU, etc. are mentioned.) A disulfide radical etc. is mentioned.

[0106] Further, these substituents may be replaced, and when it is the radical in which salt formation is possible, they may form the salt. moreover, in a certain case, i.e., 2 case of $n \geq$, although n is the integer of 1-4, even if two or more substituents are the same, they may differ. As for n , 1-3 are desirable, and 2 is the most desirable.

[0107] Moreover, it may join together mutually and these substituents may form the ring (for example, benzene ring the non-aromatic series of 5 members thru/or 7 member rings, or aromatic series. Furthermore, this ring may be replaced by other substituents (for example, a halogen atom, a carboxy group).

[0108] Preferably as a substituent expressed with R An alkyl group, an alkenyl radical, An alkynyl group, an aralkyl radical, an aryl group, the amino group, an alkoxy group, An acyl group, an alkoxy carbonyl group, an acyloxy radical, the acylamino radical, An alkoxy carbonylamino radical, a sulfonylamino radical, a sulfamoyl group, A carbamoyl group, an ureido radical, an alkylthio group, a sulfonyl group, a hydroxy group, They are a sulfhydryl group, a halogen

atom, a cyano group, a sulfonic group, a carboxy group, a nitro group, and a heterocycle radical. Still more preferable are an alkyl group, an alkenyl radical, an aralkyl radical, the amino group, an alkoxy group, an alkylthio group, a hydroxy group, a sulfhydryl group, a halogen atom, a sulfonic group, and a carboxy group.

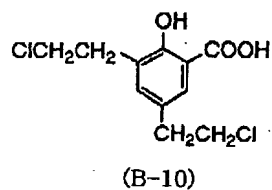
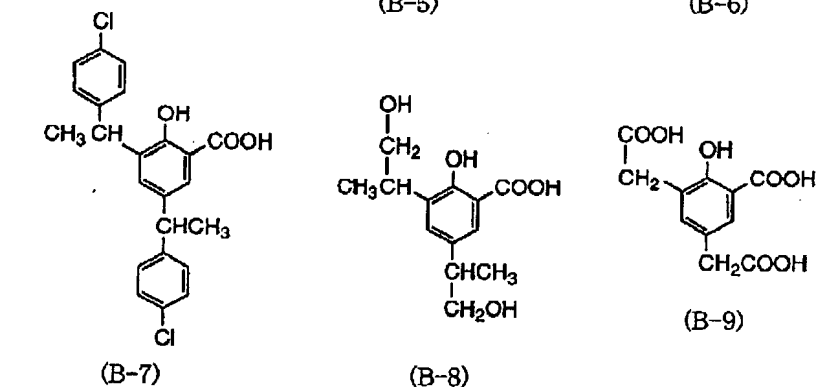
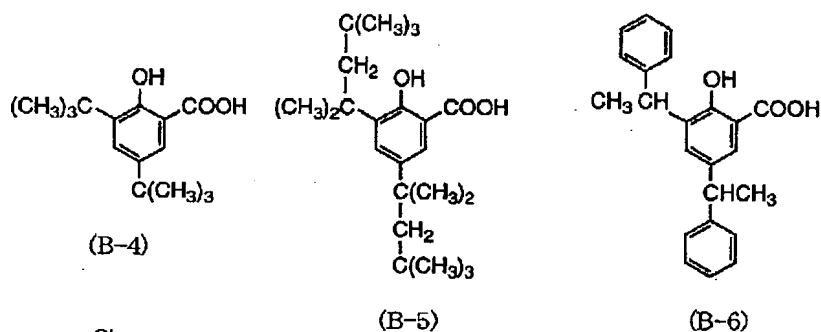
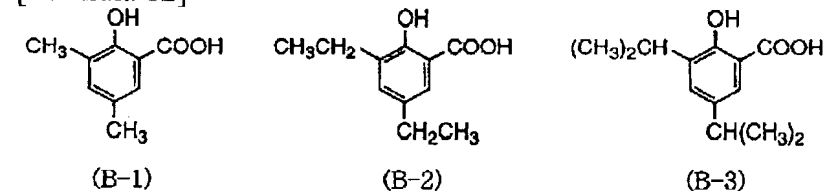
[0109] Furthermore, in a formula (B), especially the thing that an alkyl group (an aralkyl radical is also included.) replaces by the ortho position and/or the para position of a hydroxyl group is desirable.

[0110] Moreover, the bisphenol structure combined through one carbon also has the more desirable compound of a formula (B).

[0111] Next, although the example of the compound of a formula (B) is shown, it is not limited to this.

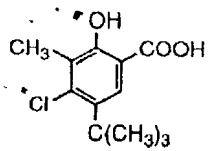
[0112]

[Formula 12]

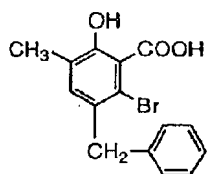


[0113]

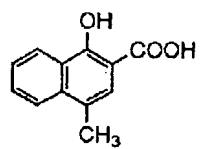
[Formula 13]



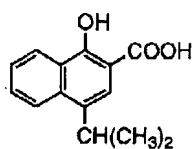
(B-11)



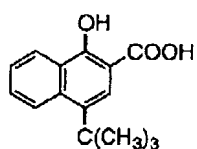
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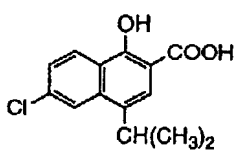
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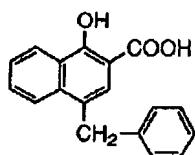
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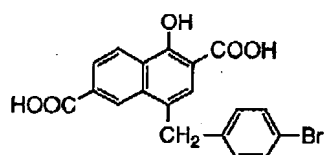
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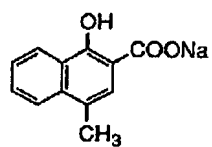
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(B-17)

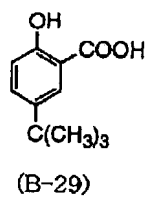
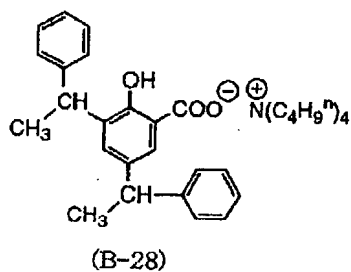
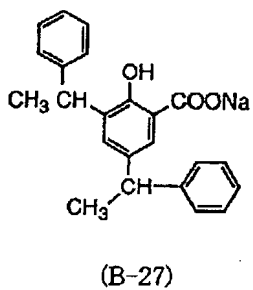
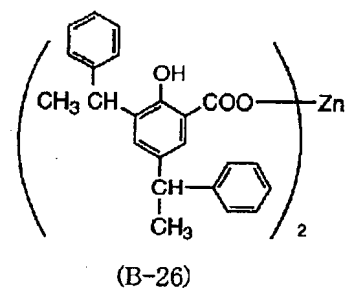
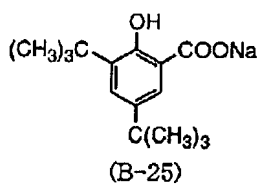
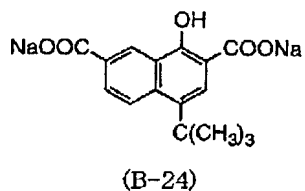
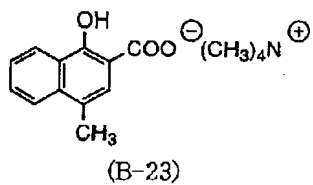
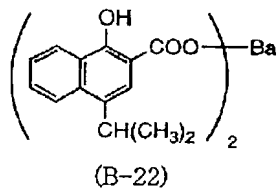
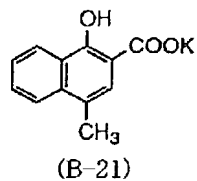
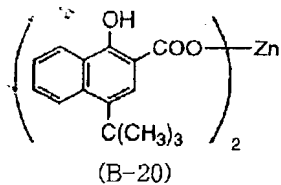


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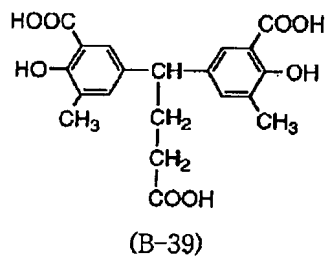
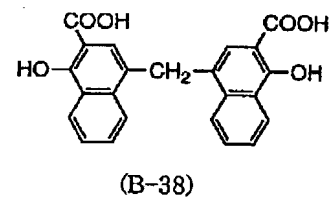
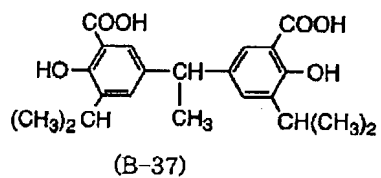
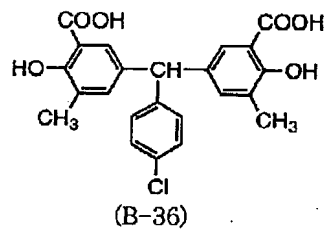
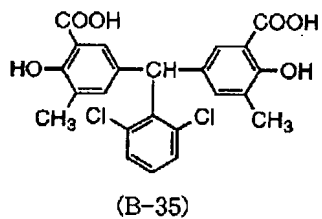
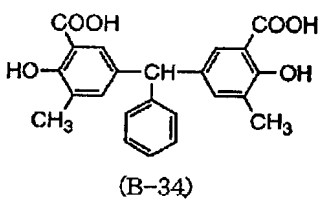
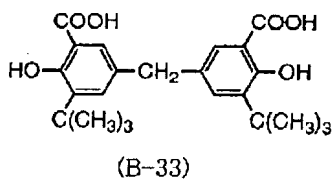
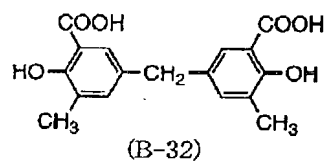
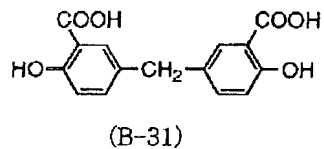
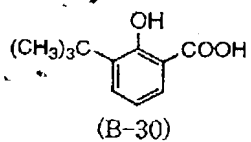


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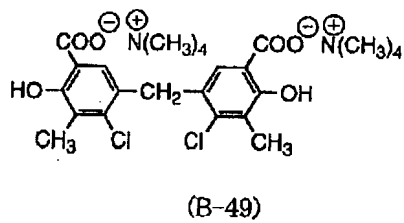
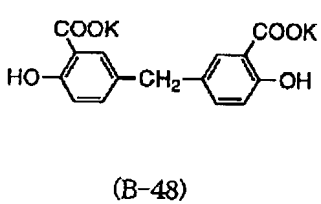
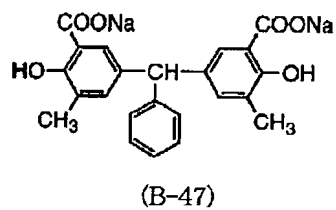
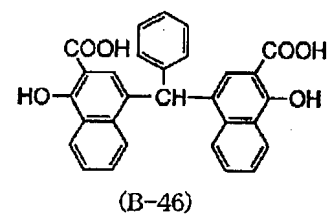
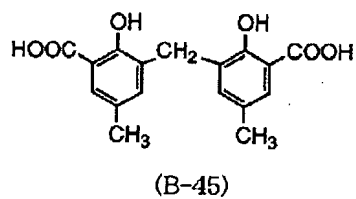
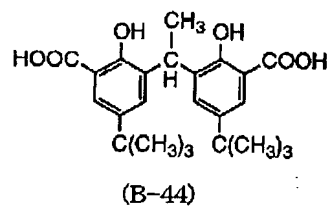
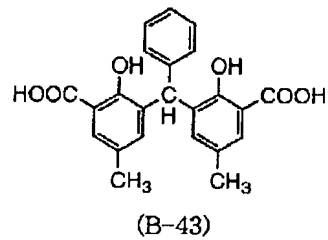
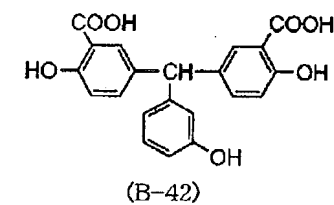
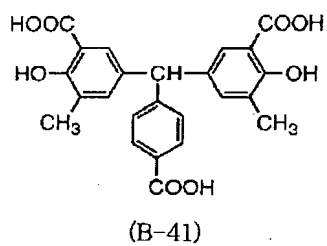
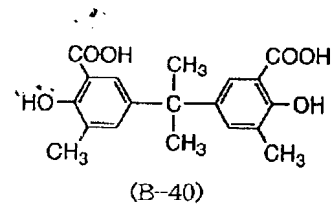
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[Formula 14]



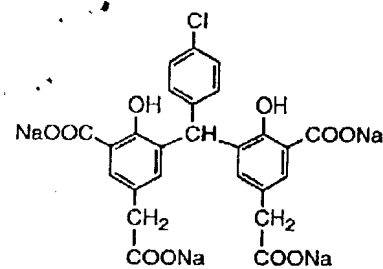
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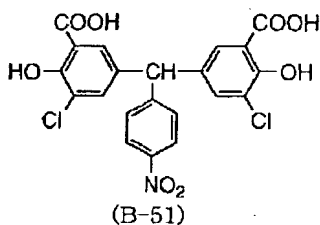
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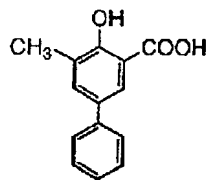
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[Formula 17]



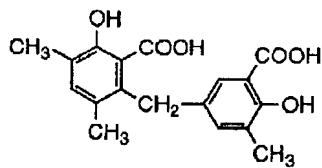
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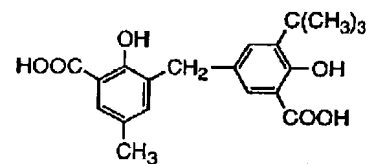
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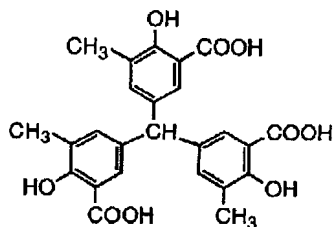
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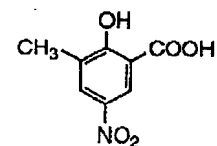
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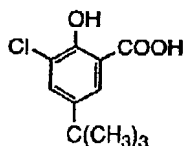
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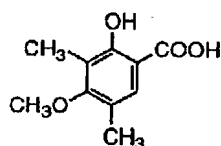
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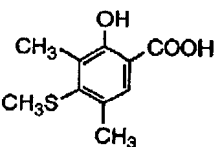
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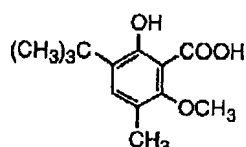
(B-57)



(B-58)



(B-59)



(B-60)

[0118] The compound of the formula (B) of this invention is easily compoundable with the method which may use a commercial thing and is indicated by JP,2-251838,A, J.Med.Chem., the acid-catalyst condensation reaction of a salicylic acid given in 34,342 (1991), and a carbonyl compound, etc.

[0119] The compound of the formula (B) of this invention can be dissolved and used for water or a suitable organic solvent (a methanol, ethanol, propanol, fluorination alcohol), for example, alcohols, ketones (an acetone, methyl ethyl ketone), dimethylformamide, dimethyl sulfoxide, methyl Cellosolve, etc.

[0120] Moreover, with the emulsification variational method already known well, it can dissolve using auxiliary solvents, such as oil, such as dibutyl phthalate, tricresyl phosphate, glyceryl triacetate, or diethyl phthalate, ethyl acetate, and a cyclohexanone, and an emulsification distribution object can be produced and used mechanically. Or by the method learned as a solid-state variational method, into water, a ball mill, a colloid mill, a Sand grinder mill, MANTON gaulin, a Micro fluidizer, or an ultrasonic wave can distribute, and powder can be used.

[0121] Although you may add to a base material in the layer by the side of an image formation layer, i.e., an image formation layer, and any of other layer by the side of this layer, as for the compound of the formula (B) of this invention, it is desirable to add in the layer which adjoins an image formation layer or it. As for an image formation layer, it is desirable that it is a layer containing the silver salt (organic silver salt) which can return, and is the photosensitive layer which contains a photosensitive silver halide further preferably.

[0122] The addition of the compound of the formula (B) of this invention is 1×10^{-4} - 5×10^{-2} mol/molAg still more preferably more preferably preferably [the amount (mol/molAg) of mol to Ag 1mol shows, and] 5×10^{-5} to 1×10^{-1} mol/molAg 1×10^{-5} to 5×10^{-1} mol/molAg. These may use two or more sorts together, using only one sort.

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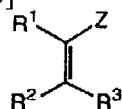
adjacent layer, or both [these] layers, in order to obtain a high contrast image. As ***** used for this invention, the acetal compound and hydrazine derivative of the specification expressed with the substitute alkene derivative expressed with a formula (1), the substitute isoxazole derivative expressed with a formula (2), and a formula (3) are used preferably.

[0124] The substitute alkene derivative expressed with the formula (1) used by this invention, the substitute isoxazole derivative expressed with a formula (2), and the specific acetal compound expressed with a formula (3) are explained

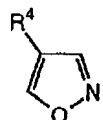
[0125]

[Formula 18]

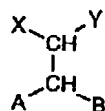
式 (1)



式 (2)



式 (3)



[0126] In a formula (1), R1, R2, and R3 express a hydrogen atom or a substituent independently, respectively, and Z expresses an electronic suction nature machine or a silyl radical. In a formula (1), it may join together mutually and R3, R1 and R2, or R3 and Z may form cyclic structure. [R1, Z,] In a formula (2), R4 expresses a substituent. In a formula (3), X and Y express a hydrogen atom or a substituent independently, respectively, and A and B express an alkoxy group, an alkylthio group, an alkylamino radical, an aryloxy group, an aryl thio radical, an ANIRINO radical heterocycle oxy-radical, a heterocycle thio radical, or the heterocycle amino group independently, respectively. In a formula (3), it may join together mutually and X, Y, or A and B may form cyclic structure.

[0127] The compound expressed with a formula (1) is explained in detail. In a formula (1), R1, R2, and R3 express a hydrogen atom or a substituent independently, respectively, and Z expresses an electronic suction nature machine or silyl radical. In a formula (1), it may join together mutually and R2, R3, R1 and R2, or R3 and Z may form cyclic structure. [R1, Z,]

[0128] When R1, R2, and R3 express a substituent, as an example of a substituent For example, a halogen atom (a fluorine atom, the Krol atom, a bromine atom, or iodine atom), An alkyl group (an aralkyl radical, a cycloalkyl radical, an activity methine group, etc. are included), An alkenyl radical, an alkynyl group, an aryl group, a heterocycle radical (the nitrogen-containing heterocycle radical of N-substitute is included), The heterocycle radical (for example, pyridinio radical), acyl group containing the nitrogen atom formed into 4 class, An alkoxy carbonyl group, an arylox carbonyl group, a carbamoyl group, A carboxy group or its salt, an imino group, the imino group replaced by N atom A thiocarbonyl group, a sulfonyl carbamoyl group, an acyl carbamoyl group, A sulfamoyl carbamoyl group, a carbazoyl radical, an oxalyl radical, an OKISA moil radical, A cyano group, a thio carbamoyl group, a hydroxy group or its salt, an alkoxy group (the radical which repeats and includes an ethyleneoxy radical or a propyleneoxy radical unit is included), An aryloxy group, a heterocycle oxy-radical, an acyloxy radical, carbonyloxy group (alkoxy ***** is aryloxy), a carbamoyloxy radical, a sulfonyloxy radical, and the amino group (alkyl --), Aryl or the heterocycle amino group, the acylamino radical, a sulfonamide radical, An ureido radical, a thio ureido radical, an imide radical, carbonylamino (alkoxy ***** is aryloxy) radical, A sulfamoylamino group, a semicarbazide radical, a thiosemicarbazide radical, A hydrazino radical, the ammonio radical of the 4th class, the OKISA moil amino group, sulfonyl (alkyl or aryl) ureido radical, An acyl ureido radical, an acyl sulfamoylamino group, a nitro group, a sulfhydryl group, A thio radical, an acyl thio radical, a sulfonyl group (alkyl or aryl), (Alkyl, aryl, or heterocycle) A sulfinyl group, a sulfonic group, or its salt, (Alkyl or aryl) A radical including a sulfamoyl group, an acyl sulfamoyl group, a sulfonyl sulfamoyl group or its salt, a phosphoryl group, a phosphoric-acid amide, or phosphoric ester structure, a silyl radical, a SUTANIRU radical, etc. are mentioned.

[0129] These substituents may be further replaced by these substituents.

[0130] With the electronic suction nature machine expressed with Z in a formula (1) Hammett's substituent constant σ is the thing of the substituent which can take a positive value. Specifically A cyano group, an alkoxy carbonyl group, an aryloxy carbonyl group, A carbamoyl group, an imino group, the imino group replaced by N atom, a thiocarbonyl group, A sulfamoyl group, an alkyl sulfonyl group, an aryl sulfonyl group, A nitro group, a halogen atom, a perfluoroalkyl radical, a perfluoro alkane amide group, A sulfonamide radical, an acyl group, a formyl group, a phosphoryl group, a carboxy group (or the salt), They are a sulfonic group (or the salt), a heterocycle radical, an alko-

radical, an alkynyl group, an acyloxy radical, an acyl thio radical, a sulfonyloxy radical, or the aryl group replaced with these electronic suction nature machine. As a heterocycle radical, it is the heterocycle radical of saturation or partial saturation, for example, a pyridyl radical, a quinolyl radical, a pyrazinyl radical, a kino KISARINIRU radical, a benzothioria ZORIRU radical, an imidazolyl radical, a Benz imidazolyl radical, a hydantoin-1-IRU radical, a succinimide radical, a phthalimide radical, etc. are mentioned here as the example.

[0131] The same thing as the substituent which the electronic suction nature machine expressed with Z in a formula may have the substituent further, and you may have as the substituent when R1, R2, and R3 of a formula (1) express substituent is mentioned.

[0132] Although R2, R3, R1 and R2, or R3 and Z may be combined mutually and cyclic structure may be formed in formula (1), the cyclic structure formed at this time is the ring of non-aromatic series, or the heterocycle of non-aromatic series. [R1, Z]

[0133] Next, the desirable range of the compound expressed with a formula (1) is described. They are a trimethylsilyl radical, t-butyldimethylsilyl radical, a phenyl dimethylsilyl radical, a triethyl silyl radical, a triisopropyl silyl radical, trimethylsilyl dimethylsilyl radical, etc. concretely preferably as a silyl radical expressed with Z in a formula (1).

[0134] As an electronic suction nature machine expressed with Z in a formula (1), preferably The following radicals with 0-30 total carbon, i.e., a cyano group, an alkoxy carbonyl group, An aryloxy carbonyl group, a carbamoyl group thiocarbonyl group, An imino group, the imino group replaced by N atom, a sulfamoyl group, an alkyl sulfonyl group An aryl sulfonyl group, a nitro group, a perfluoroalkyl radical, an acyl group, They are a formyl group, a phosphoryl group, an acyloxy radical, an acyl thio radical, or the phenyl group replaced with the electronic suction nature machine of arbitration. Still more preferably A cyano group, an alkoxy carbonyl group, a carbamoyl group, an imino group, a sulfamoyl group, An alkyl sulfonyl group, an aryl sulfonyl group, an acyl group, a formyl group, It is a phosphoryl group, a trifluoromethyl radical, or the phenyl group replaced with the electronic suction nature machine of arbitration and they are a cyano group, a formyl group, an acyl group, an alkoxy carbonyl group, an imino group, or a carbamoyl group especially preferably.

[0135] The radical expressed with Z in a formula (1) has a more desirable electronic suction nature machine.

[0136] As a substituent expressed with R1, R2, and R3 in a formula (1), preferably The electronic suction nature machine specifically expressed with Z of an above-mentioned formula (1) by the radical with 0-30 total carbon, and radical of homonymy, And an alkyl group, a hydroxy group (or the salt), a sulfhydryl group (or the salt), An alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, The aryl group which is not replaced [an aryl thio radical, a heterocycle thio radical, the amino group, an alkylamino radical, an arylamino radical, the heterocycle amino group, an ureido radical, the acylamino radical, a sulfonamide radical, substitute or] is mentioned.

[0137] Furthermore in a formula (1), R1 is an electronic suction nature machine, an aryl group, an alkylthio group, a alkoxy group or the acylamino radical, a hydrogen atom, or a silyl radical preferably.

[0138] When R1 expresses an electronic suction nature machine, preferably The following radicals with 0-30 total carbon, Namely, a cyano group, a nitro group, an acyl group, a formyl group, an alkoxy carbonyl group, An aryloxy carbonyl group, a thiocarbonyl group, an imino group, the imino group replaced by N atom, An alkyl sulfonyl group an aryl sulfonyl group, a carbamoyl group, a sulfamoyl group, A trifluoromethyl radical, a phosphoryl group, a carbo group (or the salt), It is the heterocycle radical of saturation or partial saturation. Further Or a cyano group, an acyl group, The heterocycle radical of a formyl group, an alkoxy carbonyl group, a carbamoyl group, an imino group, the imino group replaced by N atom, a sulfamoyl group, a carboxy group (or the salt), saturation, or partial saturation is desirable. It is the heterocycle radical of a cyano group, a formyl group, an acyl group, an alkoxy carbonyl group, a carbamoyl group, saturation, or partial saturation especially preferably.

[0139] Although it is the phenyl group of substitute or no replacing with 6-30 total carbon preferably and the substituent of arbitration is mentioned as a substituent when R1 expresses an aryl group, the substituent of electronic suction nature is desirable especially.

[0140] In a formula (1), R1 is a time of expressing an electronic suction nature machine or an aryl group more preferably.

[0141] As a substituent expressed with R2 and R3 in a formula (1), preferably The electronic suction nature machine concretely expressed with Z of an above-mentioned formula (1), and the radical of homonymy, An alkyl group, a hydroxy group (or the salt), a sulfhydryl group (or the salt), It is the phenyl group which is not replaced [an alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, an aryl thio radical, a heterocycle thio radical the amino group, an alkylamino radical, an ANIRINO radical the heterocycle amino group, the acylamino radical, substitute or].

[0142] In a formula (1), still more preferably, either is a hydrogen atom and R2 and R3 are the times of another side expressing a substituent. Preferably as the substituent An alkyl group, a hydroxy group (or the salt), A sulfhydryl group (or the salt), an alkoxy group, an aryloxy group, A heterocycle oxy-radical, an alkylthio group, an aryl thio radical, a heterocycle thio radical, The amino group, an alkylamino radical, an ANIRINO radical, the heterocycle amino group

the acylamino radical (especially perfluoro alkane amide group), They are the phenyl group which is not replaced [a sulfonamide radical, substitute, or] or a heterocycle radical. Still more preferably A hydroxy group (or the salt), a sulfhydryl group (or the salt), It is an alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, aryl thio radical, a heterocycle thio radical, or a heterocycle radical, and they are a hydroxy group (or the salt), an alkoxy group, or a heterocycle radical especially preferably.

[0143] In a formula (1), Z, R1, or also when R2 and R3 form cyclic structure again, it is desirable. In this case, as for that number of total carbon that the cyclic structure formed is the ring of non-aromatic series, or the heterocycle of n aromatic series, is the cyclic structure of 5 member - 7 member preferably, and includes a substituent, to 1-40, and a pan, 3-30 are desirable.

[0144] Although it is more desirable, in the compound expressed with a formula (1) one Z expresses a cyano group, formyl group, an acyl group, an alkoxy carbonyl group, an imino group, or a carbamoyl group, and R1 expresses an electronic suction nature machine or an aryl group. Either R2 or R3 by the hydrogen atom Another side is a compound showing a hydroxy group (or the salt), a sulfhydryl group (or the salt), an alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, an aryl thio radical, a heterocycle thio radical, or a heterocycle radical. Although it is desirable especially in the compound expressed with a formula (1) further again, one Z and R1 form the cyclic structure of 5 members of non-aromatic series - 7 members. Either R2 or R3 by the hydrogen atom Another side is a compound showing a hydroxy group (or the salt), a sulfhydryl group (or the salt), an alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, an aryl thio radical, a heterocycle thio radical, or a heterocycle radical. At this time, as Z which forms the cyclic structure of non-aromatic series with R1, an acyl group, a carbamoyl group, an oxy-carbonyl group, a thiocarbonyl group, a sulfonyl group, etc. are desirable, and an acyl group, a carbamoyl group, an oxy-carbonyl group, a thiocarbonyl group, a sulfonyl group, an imino group, the imino group replaced by N atom, the acylamino radical, a carbonyl thio radical, etc. are desirable as R1.

[0145] Next, the compound expressed with a formula (2) is explained. In a formula (2), R4 expresses a substituent. The thing same as a substituent expressed with R4 as the thing explaining the substituent of R1-R3 of a formula (1) is mentioned.

[0146] The substituent expressed with R4 is an electronic suction nature machine or an aryl group preferably. When expresses an electronic suction nature machine, preferably, it is the heterocycle radical of the following radicals with 30 total carbon, i.e., a cyano group, a nitro group, an acyl group, a formyl group, an alkoxy carbonyl group, an arylo carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, a carbamoyl group, a sulfamoyl group, a trifluoromethyl radical, a phosphoryl group, an imino group, saturation, or partial saturation, and a cyano group, an a group, a formyl group, an alkoxy carbonyl group a carbamoyl group, a sulfamoyl group, an alkyl sulfonyl group, an aryl sulfonyl group, and a heterocycle radical are still more desirable They are a cyano group, a formyl group, an acy group, an alkoxy carbonyl group, a carbamoyl group, or a heterocycle radical especially preferably.

[0147] When R4 expresses an aryl group, it is the phenyl group of substitute or no replacing with 0-30 total carbon preferably, and as a substituent, when R1, R2, and R3 of a formula (1) express a substituent, the same thing as what was explained as the substituent is mentioned.

[0148] R4 is a phenyl group which is not replaced [a cyano group, an alkoxy carbonyl group, a carbamoyl group, a heterocycle radical, substitute, or] especially preferably, and is a cyano group, a heterocycle radical, or an alkoxy carbonyl group most preferably.

[0149] Next, the compound expressed with a formula (3) is explained in detail. In a formula (3), X and Y express a hydrogen atom or a substituent independently, respectively, and A and B express an alkoxy group, an alkylthio group, an alkylamino radical, an aryloxy group, an aryl thio radical, an ANIRINO radical, a heterocycle thio radical, a heterocycle oxy-radical, or the heterocycle amino group independently, respectively. It may join together mutually a X, Y, or A and B may form cyclic structure.

[0150] The thing same as a substituent expressed with X and Y in a formula (3) as the thing explaining the substituent of R1-R3 of a formula (1) is mentioned. Specifically An alkyl group (a perfluoroalkyl radical, a TORIKURORO methyl group, etc. are included), An aryl group, a heterocycle radical, a halogen atom, a cyano group, a nitro group, an alkenyl radical, An alkynyl group, an acyl group, a formyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, An imino group, the imino group replaced by N atom, a carbamoyl group, a thiocarbonyl group, An acyloxy radical, an acyl thio radical, the acylamino radical, an alkyl sulfonyl group, An aryl sulfonyl group, a sulfamoyl group, a phosphoryl group, a carboxy group (or the salt), A sulfonic group (or the salt), a hydroxy group (or the salt), a sulfhydryl group (or the salt), An alkoxy group, an aryloxy group, a heterocycle oxy-radical, an alkylthio group, an a thio radical, a heterocycle thio radical, the amino group, an alkylamino radical, an ANIRINO radical, the heterocycle amino group, a silyl radical, etc. are mentioned.

[0151] These radicals may have the substituent further. Moreover, as cyclic structure which it may join together mutually, and X and Y may form cyclic structure, and is formed in this case, the ring of non-aromatic series may also be the heterocycle of non-aromatic series.

[0152] The substituent expressed with X and Y in a formula (3) 1-40 total carbon is radicals with 1-30 total carbon more preferably. A cyano group, an alkoxy carbonyl group, an aryloxy carbonyl group, A carbamoyl group, an imino group, the imino group replaced by N atom, a thiocarbonyl group, A sulfamoyl group, an alkyl sulfonyl group, an ar sulfonyl group, A nitro group, a perfluoroalkyl radical, an acyl group, a formyl group, a phosphoryl group, the acylamino radical, an acyloxy radical, an acyl thio radical, a heterocycle radical, an alkylthio group, an alkoxy group or an aryl group is mentioned.

[0153] In a formula (3) more preferably X and Y A cyano group, a nitro group, an alkoxy carbonyl group, A carbam group, an acyl group, a formyl group, an acyl thio radical, the acylamino radical, A thiocarbonyl group, a sulfamoyl group, an alkyl sulfonyl group, an aryl sulfonyl group, An imino group, the imino group replaced by N atom, a phosphoryl group, a trifluoromethyl radical, They are a heterocycle radical or the replaced phenyl group. Preferably especially A cyano group, An alkoxy carbonyl group, a carbamoyl group, an alkyl sulfonyl group, They are an aryl sulfonyl group, an acyl group, an acyl thio radical, the acylamino radical, a thiocarbonyl group, a formyl group, an imino group, the imino group replaced by N atom, a heterocycle radical, or the phenyl group replaced with the electronic suction nature machine of arbitration.

[0154] It is desirable, also when X and Y join together mutually and form the ring of non-aromatic series, or the heterocycle of non-aromatic series. At this time, the cyclic structure formed has desirable 5 member - 7 member ring and, as for that number of total carbon, 3-30 are desirable to 1-40, and a pan. As X and Y which form cyclic structure an acyl group, a carbamoyl group, an oxy-carbonyl group, a thiocarbonyl group, a sulfonyl group, an imino group, th imino group replaced by N atom, the acylamino radical, a carbonyl thio radical, etc. are desirable.

[0155] In a formula (3), A and B express an alkoxy group, an alkylthio group, an alkylamino radical, an aryloxy group an aryl thio radical, an ANIRINO radical, a heterocycle thio radical, a heterocycle oxy-radical, or the heterocycle amino group independently, respectively, it may join together mutually and these may form cyclic structure. Preferab 1-40 total carbon is radicals with 1-30 total carbon more preferably, and the radical expressed with A and B in a formula (3) may have the substituent further.

[0156] In a formula (3), A and B have the more desirable case where these join together mutually and cyclic structure formed. The cyclic structure formed at this time has the desirable heterocycle of the non-aromatic series of 5 member 7 member ring, and, as for that number of total carbon, 3-30 are desirable to 1-40, and a pan. In this case, if the example (-A-B-) which A and B connected is given For example, -O- 2-O-, -O- (CH₂) 3-O-, -S- (CH₂) 2-S-, -S- (CH₂) 3-S-, -S-ph-S-, -N (CH₂) They are (CH₃)-(CH₂)2-O-, -N(CH₃)-(CH₂)2-S-, -O-(CH₂)2-S-, -O-(CH₂)3-S-, -N(CH₃) ph-O-, -N(CH₃)-ph-S-, -N(ph)-(CH₂)2-S-, etc.

[0157] The adsorbent radical which sticks to the compound expressed with the formula (1) of this invention - a form (3) to a silver halide may be incorporated. As such an adsorption radical, an alkylthio group, an aryl thio radical, a thiourea radical, U.S. Pat. No. 4,385,108, such as a thioamide radical, a mercapto heterocycle radical, and a triazole radical, Said 4,459,347 numbers, JP,59-195233,A, 59-200231, 59-201045, 59-201046, 59-201047, The radical indicated by 59-201048, 59-201049, JP,61-170733,A, 61-270744, 62-948, 63-234244, 63-234245, and 63-234246 is mentioned. Moreover, the adsorption radical to these silver halides may be precursor-ized. The radical indicated by JP,2-285344,A is mentioned as such a precursor.

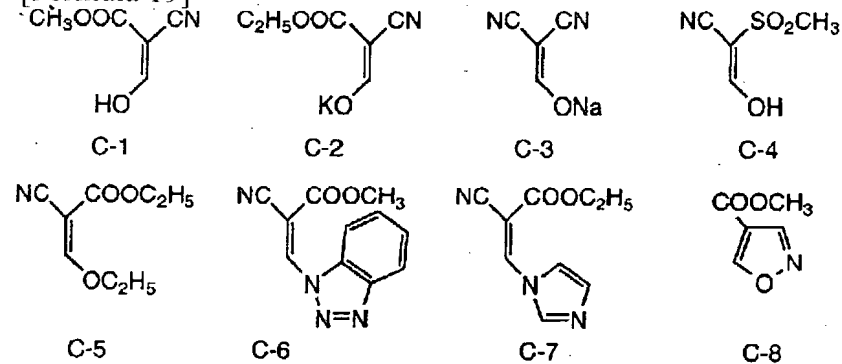
[0158] The ballast radical or polymer by which the compound expressed with the formula (1) of this invention - a formula (3) is regularly used in additives for immobility photographs, such as a coupler, in it may be incorporated. T in which especially the ballast radical is included is one of the desirable examples of this invention. To the photograp nature which has eight or more carbon numbers, a ballast radical is a comparatively inactive radical, for example, ca be chosen from an alkyl group, an aralkyl radical, an alkoxy group, a phenyl group, an alkylphenyl radical, a phenox group, an alkyl phenoxy group, etc. Moreover, as polymer, the thing of a publication is mentioned, for example to JP 100530,A.

[0159] The compound expressed with the formula (1) of this invention - a formula (3) the inside of it -- a cation natu machine (the radical which specifically contains the ammonio radical of the 4th class --) Or radicals including the repeat unit of an ethyleneoxy radical or a propyleneoxy radical, such as a nitrogen-containing heterocycle radical containing the nitrogen atom formed into 4 class, (Alkyl, aryl, or heterocycle) The dissociative radicals (a carboxy group, a sulfonic group, an acyl sulfamoyl group, carbamoyl sulfamoyl group, etc.) which can be dissociated by the thio radical or the base may be contained. Especially the thing in which the radical including the repeat unit of an ethyleneoxy radical or a propyleneoxy radical or (alkyl, aryl, or heterocycle) the thio radical is contained is one of th desirable examples of this invention. As an example of these radicals, the compound of a publication is mentioned, f example to JP,7-234471,A, JP,5-333466,A, JP,6-19032,A, JP,6-19031,A, JP,5-45761,A, a U.S. Pat. No. 4994365 number, a U.S. Pat. No. 4988604 number, JP,3-259240,A, JP,7-5610,A, JP,7-244348,A, German country JP,4006032,B, etc.

[0160] Next, the example of a compound expressed with the formula (1) of this invention - a formula (3) is shown below. However, this invention is not limited to the following compounds.

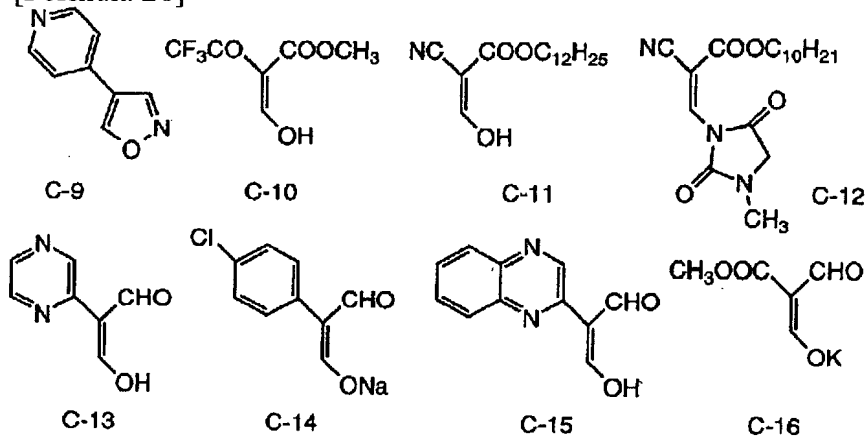
[0161]

[Formula 19]



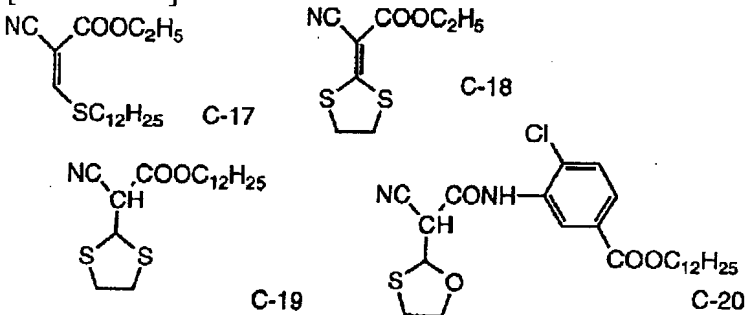
[0162]

[Formula 20]



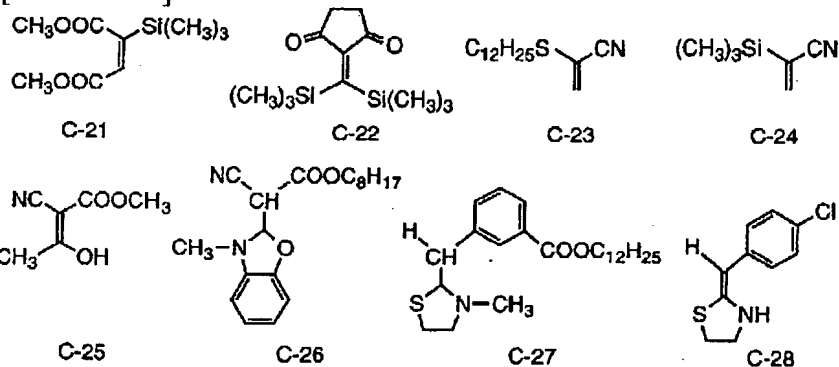
[0163]

[Formula 21]



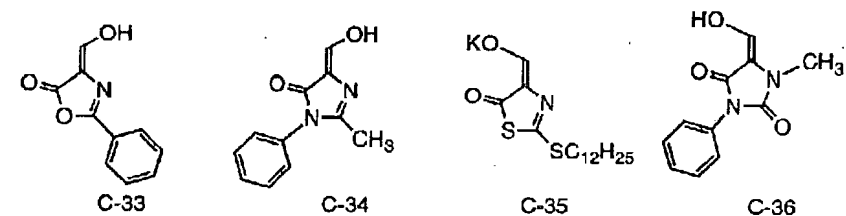
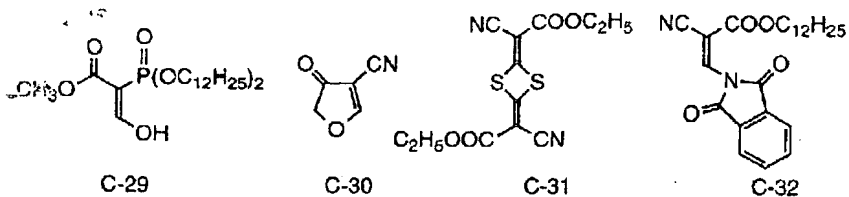
[0164]

[Formula 22]

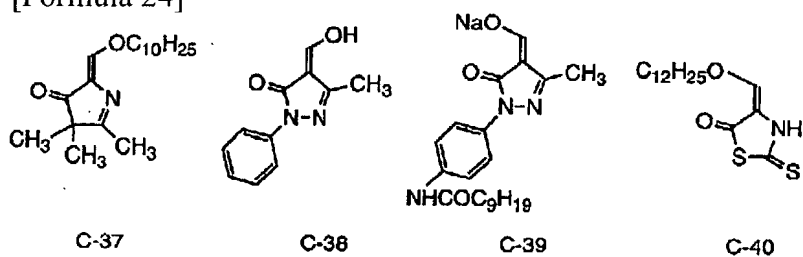


[0165]

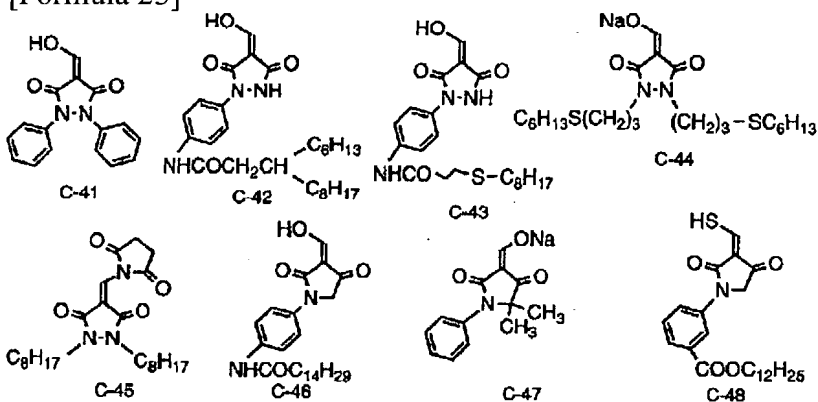
[Formula 23]



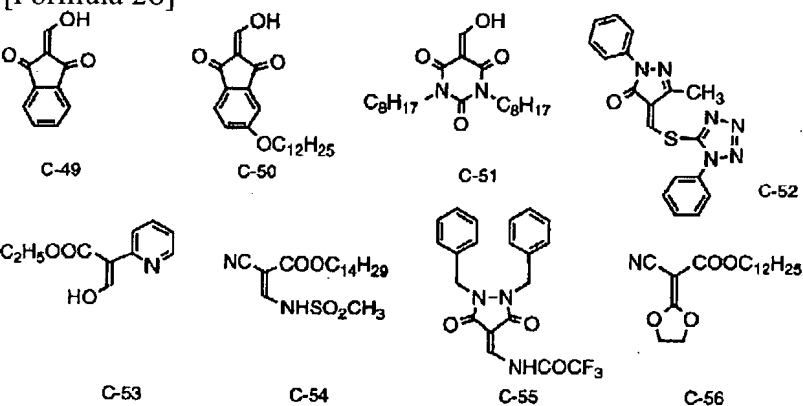
[0166]
[Formula 24]



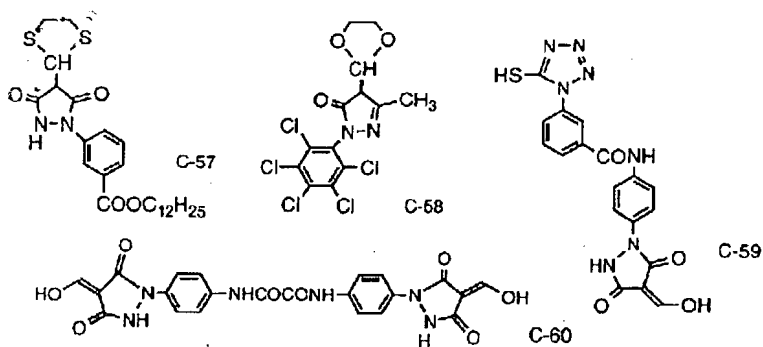
[0167]
[Formula 25]



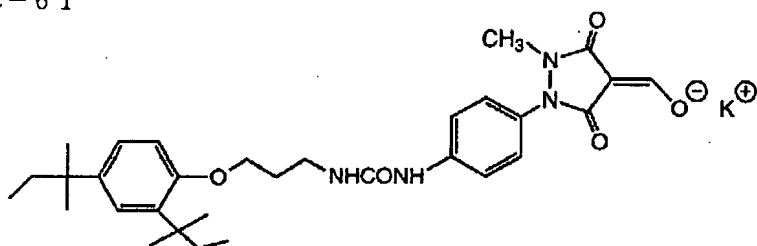
[0168]
[Formula 26]



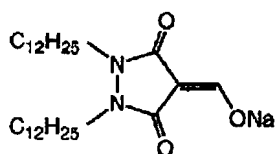
[0169]
[Formula 27]



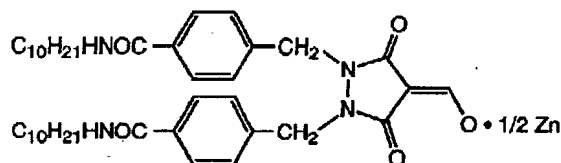
[0170]
[Formula 28]
C-61



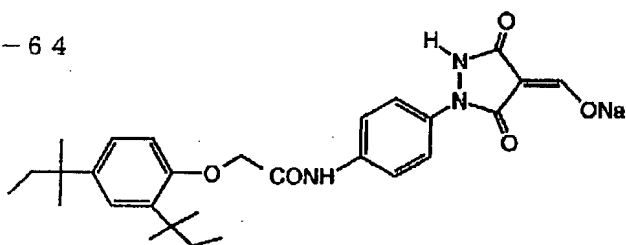
C-62



C-63



C-64



[0171] The compound expressed with the formula (1) of this invention - a formula (3) can be dissolved and used for water or a suitable organic solvent (a methanol, ethanol, propanol, fluorination alcohol), for example, alcohols, keton (an acetone, methyl ethyl ketone), dimethylformamide, dimethyl sulfoxide, methyl Cellosolve, etc.

[0172] Moreover, with the emulsification variational method already known well, it can dissolve using auxiliary solvents, such as oil, such as dibutyl phthalate, tricresyl phosphate, glyceryl triacetate, or diethyl phthalate, ethyl acetate, and a cyclohexanone, and an emulsification distribution object can be produced and used mechanically. Or b the method learned as a solid-state variational method, into suitable solvents, such as water, a ball mill, a colloid mil or an ultrasonic wave can distribute, and the powder of a compound can be used.

[0173] Although you may add to a base material in any layer of the binder layer by the side of an image formation layer, i.e., an image formation layer, and other binder layers by the side of this layer, as for the compound expressed with the f rmul (1) f this inventi n - f rmul (3), it is desir ble t dd in the binder l yer which dj ins n im ge

formation layer or it.

[0174] The addition of the compound expressed with the formula (1) of this invention - a formula (3) has desirable 1×10^{-6} to 1×10^{-1} mol to one mol of silver, its 1×10^{-5} to 5×10^{-1} - one mol is more desirable, and its 2×10^{-5} to 2×10^{-1} - one mol the most desirable.

[0175] Although the compound expressed with a formula (1) - a formula (3) is easily compoundable by the well-known method, the method of a U.S. Pat. No. 5545515 number, a U.S. Pat. No. 5635339 number, a U.S. Pat. No. 5654130 number, the international patent WO -97/No. 34196 or Japanese Patent Application No. No. 354107 [nine to], Japanese Patent Application No. No. 309813 [nine to], and Japanese Patent Application No. [No. 272002 / nine to publication is compoundable to reference, for example.

[0176] One sort of compounds expressed with the formula (1) of this invention - a formula (3) may be used, or may two or more sorts together. Besides the above-mentioned thing, moreover, a U.S. Pat. No. 5545515 number, a U.S. Pat. No. 5635339 number, A U.S. Pat. No. 5654130 number, the international patent WO -97/No. 34196, a compound given in a U.S. Pat. No. 5686228 number, Again Or Japanese Patent Application No. No. 279962 [eight to], Japanese Patent Application No. No. 228881 [nine to], Japanese Patent Application No. No. 273935 [nine to], Japanese Patent Application No. No. 354107 [nine to], Japanese Patent Application No. No. 309813 [nine to], The compound indicated by Japanese Patent Application No. No. 296174 [nine to], Japanese Patent Application No. No. 282564 [nine to], Japanese Patent Application No. No. 272002 [nine to], Japanese Patent Application No. No. 272003 [nine to], and Japanese Patent Application No. No. 332388 [nine to] may be used together and used.

[0177] As hydrazine system ***** used for this invention, the following hydrazine derivative is used preferably. The hydrazine derivative used for this invention is compoundable by the various methods indicated by the following patent again.

[0178] With the compound expressed with the (** 1) of a publication to JP,6-77138,B, they are specifically a page 3 of the said official report, and the compound of a 4-page publication. the compound expressed with the general formula of a publication to JP,6-93082,B -- concrete -- page [of the said official report] 8 - the compound of 1-38 of a 18-page publication. They are specifically the compound 6-1 of the page 25 of the said official report, the compound 4-1 of a 26-page publication - a compound 4-10, the compound 5-1 to 5-42 of a 28 pages - 36 pages publication and 39 pages and a 40-page publication - a compound 6-7 with the compound expressed with the general formula (4), general formula (5), and general formula (6) of a publication to JP,6-230497,A. the compound expressed with the general formula (1) and general formula (2) of a publication to JP,6-289520,A -- concrete -- page [of the said official report - compound 1-1- of a 7-page publication -- 1-17 and 2-1. JP,6-313936,A -- a publication -- and (** 2) (** 3) the compound expressed -- concrete -- page [of the said official report] 6 - the compound of a 19-page publication. the compound expressed with the (** 1) of a publication to JP,6-313951,A -- concrete -- page [of the said official report] 3 - the compound of a 5-page publication. the compound expressed with the general formula (I) of a publication to JP,7-5610,A -- concrete -- page [of the said official report] 5 - the compound I-1 to I-38 of a 10-page publication. the compound expressed with the general formula (II) of a publication to JP,7-77783,A -- concrete -- page [of the said official report] 10 - compound II-1-II-102 of a 27-page publication. the compound expressed with the general formula (H) and general formula (Ha) of a publication to JP,7-104426,A -- concrete -- page [of the said official report] 8 - the compound H-1 to H-44 of a 15-page publication. It is specifically the compound N-1 to N-30 given in this official report with the compound which is a compound characterized by having the Nonion nature machine which forms the hydrogen atom and intramolecular hydrogen bond of an anionic radical or a hydrazine near the hydrazine radical of a Japanese Patent Application No. [No. 191007 / seven to] publication, and is especially expressed with a general formula (A), a general formula (B), a general formula (C), a general formula (D), a general formula (E), and a general formula (F). With the compound expressed [Japanese Patent Application No. / No. 191007 / seven to] with the general formula (1) of a publication, it is specifically the compound D-1 to D-55 given in this official report.

[0179] The hydrazine derivative of the versatility of the 34-page publication from 25 pages of the "well-known technology (1-207 pages)" (the Aztec company **) of March 22, 1991 issue furthermore. The compound D-2 of JP,6-36354,A (6 pages - 7 pages), and D-39.

[0180] Hydrazine system ***** used for this invention can be dissolved and used for a suitable organic solvent (a methanol, ethanol, propanol, fluorination alcohol), for example, alcohols, ketones (an acetone, methyl ethyl ketone), dimethylformamide, dimethyl sulfoxide, methyl Cellosolve, etc.

[0181] Moreover, with the emulsification variational method already known well, it can dissolve using auxiliary solvents, such as oil, such as dibutyl phthalate, tricresyl phosphate, glyceryl triacetate, or diethyl phthalate, ethyl acetate, and a cyclohexanone, and an emulsification distribution object can be produced and used mechanically. Or by the method learned as a solid-state variational method, into water, a ball mill, a colloid mill, or an ultrasonic wave can distribute, and the powder of a hydrazine derivative can be used.

[0182] Although you may add to a base material in any layer of the layer by the side of an image formation layer, i.e. an image formation layer, and other binder layers by the side of this layer, as for hydrazine system ***** preferably

used for this invention, it is desirable to add in the binder layer which adjoins an image formation layer or it.

[0183] The addition of hydrazine system ***** used for this invention has desirable 1×10^{-6} to 1×10^{-1} - two mols to one mol of silver, its 1×10^{-5} to 5×10^{-1} - three mols are more desirable, and its 2×10^{-5} to 5×10^{-1} - three mols are the most desirable.

[0184] Moreover, this invention can use a high contrast-ized accelerator together with above ***** for superhard to image formation. For example, an amine compound given in U.S. Pat. No. 5,545,505 and hydroxamic acid given in a concrete target at AM-1-AM-5 and said 5,545,507 numbers, Specifically HA-1-HA-11 and acrylonitrile given in said 5,545,507 numbers Specifically CN-1-CN-13, a hydrazine compound given in said 5,558,983 numbers, Specifically, A-1 to A-42, B-1 to B-27, C-1 to C-14, etc. can be used for CA-1-CA-6, the ONYU-MU salts of a Japanese Patent Application No. [No. 132836 / eight to] publication, and a concrete target.

[0185] The synthetic method of these high contrast-ized accelerators, the addition method, an addition, etc. can be performed as indicated by said each citation patent.

[0186] It is desirable to use together with ***** the acid which can hydrate and do diphosphorus pentaoxide, or its salt to this invention, and to use it for it. As the acid which can hydrate and do diphosphorus pentaoxide, or its salt, there are a metaphosphoric acid (salt), a pyrophosphoric acid (salt), orthophosphoric acid (salt), triphosphoric acid (salt), 4 phosphoric acids (salt), hexametaphosphoric acid (salt), etc. As the acid which can hydrate and do diphosphorus pentaoxide used especially preferably, or its salt, it is orthophosphoric acid (salt) and hexametaphosphoric acid (salt) and there are a sodium orthophosphate, orthophosphoric acid 2 hydrogen sodium, hexametaphosphoric acid sodium, hexametaphosphoric acid ammonium, etc. as a concrete salt.

[0187] The acid which can hydrate and do diphosphorus pentaoxide which can be preferably used for this invention, its salt is added in the binder layer which adjoins an image formation layer or it from the point of it being little and discovering a desired effect.

[0188] Although it is good in a desired amount to compensate for engine performance, such as sensitivity and fogging as amount of the acid which can hydrate and do diphosphorus pentaoxide used for this invention, or its salt used (1m sensitive material coverage per two), 0.1 - 500 mg/m² is desirable, and 0.5 - 100 mg/m² is more desirable.

[0189] It is desirable that the reducing agent for organic silver salt is included in the heat developing sensitive material of this invention. the material of arbitration with which the reducing agent for organic silver salt returns complex ion metal silver -- you may be an organic substance preferably. Although the conventional photograph developers, such as phenidone, hydroquinone, and a catechol, are useful, a hindered phenol reducing agent is desirable. one mol of silver the field where a reducing agent has an image formation layer -- receiving -- 5-50-mol % -- being contained is desirable and it is still more desirable to be contained at 10-40-mol %. What kind of layer of the field which has an image formation layer is sufficient as the addition layer of a reducing agent. When adding in layers other than an image formation layer, it is desirable to use it more mostly with 10-50-mol % to one mol of silver. Moreover, a reducing agent may be the so-called precursor induction-ized so that it might have a function effectively only at the time of development.

[0190] In the heat developing sensitive material using organic silver salt a wide range reducing agent JP,46-6074,A, 47-1238, 47-33621, 49-46427, 49-115540, 50-14334, 50-36110, 50-147711, 51-32632, 51-1023721, 51-32324, 51-51933, 52-84727, 55-108654, 56-146133, 57-82828, 57-82829, JP,6-3793,A, a U.S. Pat. No. 3,679,426 number, said No. 3,751,252 -- said -- No. 3,751,255 -- said -- No. 3,761,270 -- said -- No. 3,782,949 -- said -- No. 3,839,048 -- said -- No. 3,928,686 -- said -- it is indicated by No. 5,464,738, German country JP,2321328,B, Europe JP,692732,B, etc. For example, a phenyl amide oxime, 2-thienyl amide oxime (And amide oxime; for example, 4-hydroxy, such as p-phenoxyphenyl amide oxime - 3) Azines, such as 5-dimethoxy benzaldehyde azine; The combination; polyhydroxy benzene of the aliphatic-carboxylic-acid aryl hydrazide and the ascorbic acid like the combination of 2 and 2'-screw (hydroxymethyl) propionyl-beta-phenylhydrazine and an ascorbic acid, A hydroxylamine, a reductone, and/or combination of a hydrazine (for example, with hydroquinone) Combination of a screw (ethoxyethyl) hydroxylamine piperidino hexose reductone, or a formyl-4-methylphenyl hydrazine etc.; Phenyl hydroxamic acid, Hydroxamic acid such as p-hydroxyphenyl hydroxamic acid and beta-Ali Nin hydroxamic acid; The combination of an azine and a sulfonamide phenol ; Ethyl-alpha-cyano-2-methylphenyl acetate, (For example, phenothiazin, 2, a 6-dichloro-4-benzenesulfonamide phenol, etc.) alpha-cyanophenyl acetic-acid derivatives, such as ethyl-alpha-cyanophenyl acetate 2, 2'-dihydroxy -1, 1'-binaphthyl, Screw-beta-naphthol which is illustrated by 6, 6'-dibromo -2, 2'-dihydroxy -1, 1'-binaphthyl, and screw (2-hydroxy-1-naphthyl) methane; the screw-beta-naphthol, and 1, 3-dihydroxybenzene derivative (for example) Combination; 3-methyl-1-phenyl-5-pyrazolones, such as 2 and 4-dihydroxy benzophenone or 2', and a 4'-dihydroxy acetophenone, etc., 5-pyrazolone; A dimethylamino hexose reductone, Anhydrodihydroaminohexose reductone And a reductone which is illustrated by the anhydro JIHIDOROPIPERIDON hexose reductone; Sulfonamide phenol reducing-agents [, such as a 2 and 6-dichloro-4-benzenesulfonamide phenol a p-benzenesulfonamide phenol,]; 1, such as chroman; 2, such as; 2, 2-dimethyl-7-t-butyl-6-hydroxychroman, etc., such as 2-phenyl indan -1 and 3-dione, 6-dimethoxy -3, 5-JIKARU O ethoxy -1, and a 4-dihdropyridine, a 4-

dihydropyridine; bisphenol (for example) Screw (2-hydroxy-3-t-butyl-5-methylphenyl) methane, A 2 and 2-screw (4-hydroxy-3-methylphenyl) propane, 4, and 4-ethylidene-screw (2-t-butyl-6-methyl phenol), 1, 1, - screw (2-hydroxy - 5-dimethylphenyl) -; ascorbic-acids derivative, such as 3, 5, and 5-trimethyl hexane and 2, and 2-screw (3, 5-dimethyl 4-hydroxyphenyl) propane An aldehyde and ketones, such as; benzyl, and a biacetyl; (For example, 1-ascorbyl palmitate, ascorbyl stearate, etc.) It has 3-pyrazolidone and the indan -1 of a certain kind, the 3-dione; chromanol, etc (tocopherol etc.). As an especially desirable reducing agent, they are a bisphenol and the chromanol.

[0191] The reducing agent of this invention may be added by what kind of methods, such as a solution, powder, and solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-ized mea (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0192] Optical density may become high when the additive known as a "color tone agent" which raises an image is included. Moreover, a color tone agent may become advantageous also when making a black silver image form. A color tone agent has 0.1 - 50% (mol) of desirable **** rare ***** per one mol of silver to the field which has an image formation layer, and being contained 0.5 to 20% (mol) is still more desirable. Moreover, a color tone agent may be the so-called precursor induction-ized so that it might have a function effectively only at the time of development

[0193] In the heat developing sensitive material using organic silver salt a wide range color tone agent JP,46-6077,A 47-10282, 49-5019, 49-5020, 49-91215, 49-91215, 50-2524, 50-32927, 50-67132, 50-67641, 50-114217, 51-3223, 5 27923, 52-14788, 52-99813, 53-1020, 53-76020, 54-156524, 54-156525, 61-183642, JP,4-56848,A, JP,49-10727,B, 54-20333 and a U.S. Pat. No. 3,080,254 number -- said -- No. 3,446,648 -- said -- No. 3,782,941 -- said -- No.

4,123,282 -- said -- it is indicated by No. 4,510,236, British JP,1380795,B, Belgium JP,841910,B, etc. The example a color tone agent A phthalimide and an N-hydroxy phthalimide; succinimide, Pyrazoline-5-ON and chinae-cortex ZORINON, 3-phenyl-2-pyrazoline-5-ON, Annular imide like 1-phenylurazole, quinazoline and 2, and 4-thiazolidinedione; North America Free Trade Agreement RUIMIDO ; A cobalt complex (For example, N-hydroxy - 8-North America Free Trade Agreement RUIMIDO) (For example, cobalt hexamine trifluoroacetate);3-mercapto - 1 4-triazole, 2, a 4-dimercapto pyrimidine, the 3-mercapto -4, 5-diphenyl - Mercaptan;N-(aminomethyl) aryl dicarboxyimide illustrated by 1, 2, and 4-triazole and 2,5-dimercapto-1,3,4-thiadiazole (for example), (N and N-dimethyl aminomethyl) A phthalimide, and N, N -(dimethyl aminomethyl)- Naphthalene -2, 3-dicarboxyimide;; and blocking pyrazole, isothiuronium derivative and a photofading agent (for example, N and N'-hexa methylenebis (the carbamoyl -3, 5-dimethyl pyrazole) --) of a certain kind 1, 8- A screw (3, 6-diaza octane) (Isothiuronium trifluoroacetate) And 2-tribromomethyl sulfonyl-(benzothiazole); and the 3-ethyl-5 [(3-ethyl-2-benzothiazolinylden 1-methylethylidene)-2-thio -2, 4-oxazolidinedione; Phthalazinone, A phthalazinone derivative, a metal salt, or 4-(1-naphthyl) phthalazinone, Derivatives, such as 6-chloro phthalazinone, 5, and 7-dimethoxy phthalazinone and 2, 3-dihydro-1, and 4-phthalazine dione; Phthalazinone and a phthalic-acid derivative (For example, combination with a phthalic acid, 4-methyl phthalic acid, 4-nitro phthalic acid, tetra-chloro phthalic anhydride, etc.); Phthalazine, a phthalazine derivative (for example, 4-(1-naphthyl) phthalazine and 6-chloro phthalazine --) 5, 7-dimethoxy phthalazine, 6-iso-butyl phthalazine, 6-tert-butyl phthalazine, A derivative or metal salts, such as 5, 7-dimethyl phthalazine and 2, and 3-dihydrophthalazine, ; phthalazine and its derivative, and a phthalic-acid derivative (for example, a phthalic acid --) Combination with 4-methyl phthalic acid, 4-nitro phthalic acid, tetra-chloro phthalic anhydride, etc.; Quinazoline dione, Bends oxazine or a naphth oxazine derivative; The rhodium complex which functions also as a source of the halide ion for silver halide generation on that spot only as a color tone modifier, for example, hexa chloro rhodium (III) acid ammonium and bromination -- a rhodium -- A nitric-acid rhodium, a hexa chloro rhodium (III) acid potassium, etc.; An inorganic peroxide and persulfate, For example, peroxidation 2 ammonium sulfide and a hydrogen peroxide; 1, 3-bends oxazine -2, 4-dione, Bends oxazine -2, such as the 8-methyl 3-bends oxazine -2, 4-dione and 6-nitro-1, 3-bends oxazine -2, and 4-dione, 4-dione; A pyrimidine and dissymmetry triazine For example, (2,4-dihydroxypyrimidine, a 2-hydroxy-4-amino pyrimidine), etc., azauracil and a tetra-azapentalene derivative (for example, 3 and 6-dimercapto -1, 4-diphenyl-1H, 4H-2, 3a and 5, and 6a-tetra-azapentale --) And there are 1, 4-JI (o-chlorophenyl) -3, 6-dimercapto-1H, 4H-2, 3a and 5, 6a-tetra-azapentalene, etc.

[0194] The color tone agent of this invention may be added by what kind of methods, such as a solution, powder, an solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-ized mea (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0195] It is desirable to use the polymeric latex described below as a binder of this invention.

[0196] At least one of the image formation layers (photosensitive layer) containing the photosensitive silver halide o the heat developing sensitive material of this invention is the image formation layer using the polymeric latex describ below as 50% of the weight or more of all binders. (The polymeric latex which uses this image formation layer for " image formation layer of this invention" and a binder henceforth is expressed as "the polymeric latex of this nvention".) When using the heat developing sensitive material of this invention for the printing use from which

polymeric latex may be used for not only an image formation layer but a protective layer, or a back layer, and especially a dimensional change poses a problem, it is desirable to use polymeric latex also for a protective layer or a back layer again. However, the "polymeric latex" said here -- water -- an insoluble hydrophobic polymer distributes in water-soluble dispersion medium as a detailed particle. Any are sufficient as that by which polymer is emulsified in dispersion medium as a distributed condition, the thing by which the emulsion polymerization was carried out, the thing by which micell distribution was carried out, or the thing which the chain itself shape [of a molecule]-distributed with hydrophilicity-structure partially in the polymer molecule. In addition, the polymeric latex of this invention is indicated by "a synthetic-resin emulsion (back Tabira, the Inagaki *****, macromolecule publication meeting issue (1978))", "application (Takaaki Sugimura, Yasuo Kataoka, Soichi Suzuki, Keiji Kasahara edit, macromolecule publication meeting issue (1993)) of a synthetic latex", "the chemistry (Soichi Muroi work, macromolecule publication meeting issue (1970)) of a synthetic latex etc.", etc. The mean particle diameter of a particulate material has the more preferably desirable range of about 5-1000nm 1-50000nm. About the particle size distribution of a particulate material there is especially no limit and a thing with large particle size distribution may also have mono dispersion particle size distribution.

[0197] As polymeric latex of this invention, the so-called latex of a core/shell mold is sufficient except the polymeric latex of the usual homogeneity structure. In this case, a core and shell may be desirable if glass transition temperature changed.

[0198] As for the glass transition temperature (Tg) of the polymeric latex preferably used for the binder of this invention, desirable ranges differ in a protective layer, a back layer, and an image formation layer. If it is in an image formation layer, in order to urge diffusion of a photograph useful material at the time of heat developing, it is desirable that it is -30-40 degrees C. In using for a protective layer or a back layer, in order to contact various devices, the glass transition temperature of 25-70 degrees C is desirable.

[0199] The minimum film forming temperature (MFT) of the polymeric latex of this invention has 0 degree C - more preferably desirable about 70 degrees C -30 degrees C - 90 degrees C. In order to control minimum film forming temperature, a film formation assistant may be added. A film formation assistant is the organic compound (usually organic solvent) to which it is also called a plasticizer and the minimum film forming temperature of polymeric latex reduced, for example, is indicated by the above-mentioned "the chemistry (Soichi Muroi work, macromolecule publication meeting issue (1970)) of a synthetic latex."

[0200] As a polymer kind used for the polymeric latex of this invention, acrylic resin, vinyl acetate resin, polyester resin, polyurethane resin, rubber system resin, vinyl chloride resin, vinylidene chloride resin, polyolefin resin, or the copolymers exist. The polymer over which the bridge was constructed is sufficient also as the polymer which branch [the polymer of a straight chain, or] as polymer. Moreover, the so-called homopolymer in which the monomer single as polymer carried out the polymerization is sufficient, and the copolymer which carried out the polymerization is sufficient as two or more sorts of monomers. In the case of a copolymer, a random copolymer or a block copolymer sufficient. the molecular weight of polymer -- number average molecular weight -- 5000-1 million -- 10000 to about 100000 are preferably desirable. That which that whose molecular weight is too small has the inadequate dynamics reinforcement of an image formation layer, and is too large does not have bad desirable film production nature.

[0201] There is the following as an example of the polymeric latex used as a binder of the image formation layer of heat developing sensitive material of this invention. The latex of methyl methacrylate / ethyl acrylate / methacrylic-acid copolymer, the latex of methyl methacrylate / 2-ethylhexyl acrylate / styrene / acrylic-acid copolymer, the latex of styrene / butadiene / acrylic-acid copolymer, the latex of styrene / butadiene / divinylbenzene / methacrylic-acid copolymer, the latex of methyl methacrylate / vinyl chloride / acrylic-acid copolymer, the latex of a vinylidene chloride / ethyl acrylate / acrylonitrile / methacrylic-acid copolymer, etc. Moreover, marketing is also carried out and such polymer can use the following polymer. 46583 For example, a cevian A-4635, 4601 (above Daicel Chemical Industries, Ltd. make), as an example of acrylic resin As polyester resin, Nipol Lx 811, 814, 821, 820, and 857 (above Nippon Zeon Co., Ltd. make) etc. FINETEX ES 650, 611, 675, and 850 (above product made from Dainippon Ink Chemistry), As polyurethane resin, WD-size, WMS (above made in Eastman Chemical), etc. HYDRAN AP 10, 20, 3 and 40 (above product made from Dainippon Ink Chemistry) etc., As rubber system resin, LACSTAR(s) 7310K, 3307B, and 4700H, 7132C (above product made from Dainippon Ink Chemistry), Nipol Lx 416, 410, and 438C, As vinyl chloride resin (above Nippon Zeon Co., Ltd. make), 2507 etc. G351, G576 (above Nippon Zeon Co., Ltd. make) etc., As vinylidene chloride resin, L502, L513 (above Asahi Chemical Industry Co., Ltd. make), Aron D7020, D504, and D5071 (above Mitsui Toatsu Chemicals, Inc. make) etc. can mention CHEMIPEARL S120 and SA100 (above product made from Mitsui Petrochemistry) etc. as olefine resin. These polymer may be used independently, if needed may be blended two or more sorts and may be used.

[0202] Although the above-mentioned polymeric latex is used as 50% of the weight or more of all binders, as for the image formation layer of this invention, it is desirable that the above-mentioned polymeric latex is used as 70 % of the weight or more.

[0203] In the image formation layer of this invention, hydrophilic polymer, such as gelatin, polyvinyl alcohol, methyl cellulose, hydroxypropylcellulose, a carboxymethyl cellulose, and hydroxypropyl methylcellulose, may be added if needed in 50 or less % of the weight of the range of all binders. The addition of these hydrophilic polymer has 30 or less % of the weight of all the binders of an image formation layer, and 15 more desirable % of the weight or less.

[0204] As for the image formation layer of this invention, it is desirable to dry after applying the spreading liquid of basin system, and to prepare. However, the "basin system" said here means that 60% of the weight or more of the solvent (dispersion medium) of spreading liquid is water. Components other than the water of spreading liquid can be the organic solvent of water miscibilities, such as methyl alcohol, ethyl alcohol, isopropyl alcohol, methyl Cellosolve ethyl Cellosolve, dimethylformamide, and ethyl acetate. There are the following things besides water as an example a concrete solvent presentation. Water / methanol = 90/10, water / methanol = 70/30, water / ethanol = 90/10, water / isopropanol = 90/10, water/dimethylformamide = 95/5, water / methanol / dimethylformamide = 80/15/5, water / methanol / dimethylformamide = 90/5/5. [(However, a numeric character expresses weight %.) 0205] the image formation layer of this invention -- the total amount of binders -- 0.2 - 30 g/m² -- the range of 2 is more preferably desirable 1-15m. In the image formation layer of this invention, the surfactant for the cross linking agent for bridge formation and spreading nature amelioration etc. may be added.

[0206] When it sticks to a silver halide particle as sensitizing dye in this invention, as long as it can carry out the spectral sensitization of the silver halide particle and is in a desired wavelength field, what kind of thing may be used As sensitizing dye, cyanine dye, merocyanine coloring matter, complex cyanine dye, complex merocyanine coloring matter, Jolo Pau Ra cyanine dye, styryl coloring matter, a hemicyanine dye, oxo-Norian coloring matter, hemi oxo-Norian coloring matter, etc. can be used. The useful sensitizing dye used for this invention is indicated by the reference indicated or quoted by for example, the RESEARCH DISCLOSURE Item 17643 IV-A term (1978 year 12 month p.2 and this Item 1831X term (1979 year 8 month p.437). The sensitizing dye which has the spectral sensitivity which was especially suitable for the spectral characteristic of the light source of various laser imagers, a scanner, an imagesetter or a process camera can be chosen advantageously.

[0207] As an example of the spectral sensitization to red light, the so-called red light sources, such as helium-Ne laser, red semiconductor laser, and LED, are received. The compound of I-1 to I-38 given in JP,54-18726,A, the compound of I-1 to I-35 given in JP,6-75322,A, and the compound of I-1 to I-34 given in JP,7-287338,A, The compound of I-1 to I-37 given in coloring matter 1-20 given in JP,55-39818,B and JP,62-284343,A, the compound of I-1 to I-34 given in JP,7-287338,A, etc. are chosen advantageously.

[0208] To the semiconductor laser light source of a 750-1400nm wavelength field, sensitization can be advantageous carried out in spectrum with the various known coloring matter containing cyanine, merocyanine, styryl, a hemicyanine, oxo-Norian, hemi oxo-Norian, and xanthene coloring matter. Useful cyanine dye is cyanine dye which has basic nuclei, such as for example, a thiazoline nucleus, an oxazoline nucleus, a pyrroline nucleus, a pyridine nucleus, an oxazole nucleus, a thiazole nucleus, a selenazole nucleus, and an imidazole nucleus. In addition to the above-mentioned basic nucleus, a desirable thing also contains acid nuclei, such as a thiohydantoin nucleus, a rhodanine nucleus, an oxazolidinedione nucleus, a thiazoline dione nucleus, a barbituric acid nucleus, a thiazolinone nucleus, a MARONO nitril nucleus, and a pyrazolone nucleus, with a useful merocyanine color. In above-mentioned cyanine and merocyanine coloring matter, especially the thing that has an imino group or a carboxyl group is effective for example, a U.S. Pat. No. 3,761,279 number -- said -- No. 3,719,495 -- said -- No. 3,877,943 and British JP,1,466,201,B -- said -- No. 1,469,117 -- said -- you may choose from known coloring matter which was indicated by No. 1,422,057, JP,3-10391,B, 6-52387, JP,5-341432,A, 6-194781, and 6-301141 suitably.

[0209] Especially a desirable thing as structure of the coloring matter used for this invention the cyanine dye (as an example -- JP,62-58239,A --) which has a thioether joint content substituent 3-138638, 3-138642, 4-255840, 5-7265 5-72661, 6-222491, 2-230506, 6-258757, 6-317868, The coloring matter indicated by 6-324425, ***** No. 500926 [seven to], and the U.S. Pat. No. 5,541,054 number, the coloring matter (as an example -- JP,3-163440,A --) which has a carboxylic-acid radical The coloring matter indicated by No. 301141 [six to], and the U.S. Pat. No. 5,441,899 number, merocyanine coloring matter, polykaryotic merocyanine coloring matter, and polykaryotic cyanine dye (JP, 6329,A --) 49-105524, 51-127719, 52-80829, 54-61517, 59-214846, 60-6750, The coloring matter indicated by 63-159841, JP,6-35109,A, 6-59381, 7-146537, 7-146537, ***** No. 50111 [55 to], British JP,1,467,638,B, and the U.S. Pat. No. 5,281,515 number is mentioned.

[0210] Moreover, the coloring matter of example 5 publication of a U.S. Pat. No. 5,510,236 number and said 3,871,8 numbers, JP,2-96131,A, and JP,59-48753,A are indicated as coloring matter which forms J-band, and it can be used for this invention preferably.

[0211] These sensitizing dye may be used independently, may be combined two or more sorts and may be used. The combination of sensitizing dye is often especially used for the purpose of a strong color sensitizing. You are the material which does not absorb substantially the coloring matter or the light which does not have a spectral sensitization operation in itself with sensitizing dye, and the material in which a strong color sensitizing is shown may

also be included in an emulsion. the material in which the combination and strong color sensitizing of useful sensitizing dye and the coloring matter in which a strong color sensitizing is shown are shown -- Research Disclosure 176 volume 17643 (December, 1978 issue) -- the 23rd page is indicated by J term of IV or JP,49-25500,B, 43-4933, JP,59-19032 59-192242, etc.

[0212] In order to make sensitizing dye add in a silver halide emulsion May distribute them in a direct emulsion and water, a methanol, Ethanol, propanol, an acetone, methyl Cellosolve, 2, 2 and 3, 3-tetrafluoro propanol, It may dissolve in independent or the mixed solvent of solvents, such as 2, 2, and 2-trifluoro ethanol, 3-methoxy-1-propanol, 3-methoxy-1-butanol, 1-methoxy-2-propanol, and N.N-dimethylformamide, and you may add to an emulsion.

[0213] Moreover, as indicated by the U.S. Pat. No. 3,469,987 number specification etc. Dissolve coloring matter in a volatile organic solvent, and this solution is distributed in water or hydrophilic colloid. As indicated by the method of adding this distributed object into an emulsion, JP,44-23389,B, 44-27555, 57-22091, etc. How to dissolve coloring matter in an acid, to add this solution in an emulsion, or make an acid or a base live together, and add into an emulsion as an aqueous solution, How to add in an emulsion what the surfactant was made to live together and was used as the aqueous solution or the colloidal dispersion object as indicated by the U.S. Pat. No. 3,822,135 number, this No. 4,006,025 specification, etc., As coloring matter is directly distributed in hydrophilic colloid as indicated by JP,53-102733,A and 58-105141, and indicated by the method and JP,51-74624,A which add the distributed object in an emulsion Coloring matter can be dissolved using the compound which carries out a red shift, and the method of adding this solution into an emulsion can also be used. Moreover, an ultrasonic wave can also be used for dissolution.

[0214] emulsion preparation in which it is accepted that the stage to add the sensitizing dye used for this invention in the silver halide emulsion of this invention is useful until now -- what kind of -- it may be in process. For example, as indicated by specifications, such as a U.S. Pat. No. 2,735,766 number, said 3,628,960 numbers, said 4,183,756 numbers, said 4,225,666 numbers, JP,58-184142,A, and 60-196749 the particle formation production process of a silver halide or/and the stage before demineralization, and demineralization -- as indicated by specifications, such as stage from after in process and/or demineralization to before initiation of chemical ripening, and JP,58-113920,A After just before chemical ripening or a stage in process, and chemical ripening, as long as it becomes before the emulsion the stage to spreading is applied, it may be added in what kind of stage and a production process. moreover, it is indicated by specifications, such as a U.S. Pat. No. 4,225,666 number and JP,58-7629,A, -- as -- the same compound independent -- it is -- or the compound of different-species structure -- combining -- for example, particle formation being in process -- chemical ripening -- it may divide after in process or chemical-ripening completion, or before chemical ripening or the class of combination of the compound which may divide after completion as it is in process may divide, may add, divides, and is added, and a compound may be changed, and you may add.

[0215] Although it is good in a desired amount to compensate for engine performance, such as sensitivity and fogging an amount of the sensitizing dye used in this invention, 10-6-1 mol per one mol of silver halides of a photosensitive layer is desirable, and 10-4 to ten - one mol is still more desirable.

[0216] The silver halide emulsion or/and the organic silver salt in this invention are further protected by a fogging inhibitor, a stabilizer, and the stabilizer precursor to generation of additional fogging, and can be stabilized to the fall the sensitivity under inventory storage with them. Independent or the suitable fogging inhibitor which can be combined and used, a stabilizer, and a stabilizer precursor A thia ZONIUMU salt given in U.S. Pat. No. 2,131,038 and 2,694,7 An aza-indene given in U.S. Pat. No. 2,886,437 and 2,444,605, Mercury salt given in U.S. Pat. No. 2,728,663, urazo given in U.S. Pat. No. 3,287,135, A sulfo catechol given in U.S. Pat. No. 3,235,652, the oxime of a British patent [N 523,448] publication, Nitrotrone, nitroindazole, polyvalent metallic salt given in U.S. Pat. No. 2,839,405, Palladium given in a thiuronium salt, U.S. Pat. No. 2,566,263, and 2,597,915 given in U.S. Pat. No. 3,220,839, A halogenation organic compound given in platinum and gold salt, U.S. Pat. No. 4,108,665, and 4,442,202, The phosphorus compounds of a publication etc. are in triazine and U.S. Pat. No. 4,411,985 given in U.S. Pat. No. 4,128,557 and 4,137,079, No. 4,138,365, and 4,459,350.

[0217] The fogging inhibitor preferably used for this invention is an organic halogenide, for example, a compound which is indicated by JP,50-119624,A, 50-120328, 51-121332, 54-58022, 56-70543, 56-99335, 59-90842, 61-12964 62-129845, JP,6-208191,A, 7-5621, 7-2781, 8-15809, U.S. Pat. No. 5,340,712, said 5,369,000 numbers, and said 5,464,737 numbers is mentioned.

[0218] The fogging inhibitor of this invention may be added by what kind of methods, such as a solution, powder, and a solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-sized means (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover distributed assistant may be used in case solid-state particle distribution is carried out.

[0219] Although it is not required in order to carry out this invention, it is sometimes advantageous to add mercury(I salt to an emulsion layer as a fogging inhibitor. Mercury(II) salt desirable for this purpose is mercury acetate and a mercury bromide. As an addition of the mercury used for this invention, 1xten - nine mols - 1xten - three mols are the range of 1xten - eight mols - 1xten - four mols still more preferably preferably per [which was applied] one mol of

silver.

[0220] The heat developing sensitive material in this invention may contain benzoic acids for the purpose of high-sensitivity-izing or fogging prevention. Although what kind of benzoic-acid derivative is sufficient as the benzoic acid of this invention, as an example of desirable structure, the compound of a publication is mentioned to a U.S. Pat. No. 4,784,939 number, said 4,152,160 numbers, Japanese Patent Application No. No. 151242 [eight to], 8-151241, 8-98051, etc. Although the benzoic acids of this invention may be added to what kind of part of sensitive material, it is desirable to add in the layer of the field which has a photosensitive layer as an addition layer, and it is still more desirable to add in an organic silver salt content layer. Although what kind of production process at the time of organic silver salt preparation to the time of spreading liquid preparation is sufficient when you may carry out at what kind of production process of spreading liquid preparation as an addition stage of the benzoic acids of this invention and it is in an organic silver salt content layer, just before [after organic silver salt preparation to] spreading is desirable. As addition method of the benzoic acids of this invention, you may carry out by what kind of methods, such as powder, solution, and a particle distribution object. Moreover, you may add as a solution mixed with other additives, such as sensitizing dye, a reducing agent, and a color tone agent. Although what kind of amount is sufficient as an addition of the benzoic acids of this invention, 1xten - six mols or more per one mol of silver two mols or less are desirable, and 1xten - three mols or more 0.5 mols or less are still more desirable.

[0221] In order to raise the shelf life before and behind development, a mercapto compound, a disulfide compound, a thione compound can be made to contain, in order to make this invention control or promote development, to contr development and to raise spectral sensitization effectiveness.

[0222] Although the thing of what kind of structure may be used when using a mercapto compound for this invention Ar-SM' and the thing expressed with Ar-S-S-Ar are desirable. M' is a hydrogen atom or an alkali-metal atom among formula, and Ar is the ring or fused aromatic ring which has one or more nitrogen, sulfur, oxygen, seleniums, or tellurium atoms. Preferably, a complex ring is a benzimidazole NAFUSU imidazole, benzothiazole, a naphth thiazol benzoxazole, NAFUSU oxazole, benzoselenazole, benzotellurazole, an imidazole, oxazole, a pyrazole, triazole, thiadiazole, tetrazole, triazine, a pyrimidine, pyridazine, pyrazine, a pyridine, a pudding, a quinoline, or chinae-corte ZORINON. This complex ring may have what is chosen from the substituent group which consists of a halogen (for example, Br and Cl), hydroxy ** amino, carboxy, alkyl (for example, one or more carbon atoms, the thing which has 4 carbon atoms preferably), alkoxy (for example, one or more carbon atoms, the thing which has 1-4 carbon atoms preferably) one, and aryl (you may have the substituent). a mercapto substitute complex aromatic compound -- **, if carries out 2-mercaptobenzimidazole, 2-mercapto benzoxazole, 2-mercaptobenzothiazole, 2-mercapto-5-methylbenzimidazol, 6-ethoxy-2-mercaptobenzothiazole, 2, and 2'-dithio screw-benzothiazole, 3-mercapto - 1, 2, 4-triazole, 4, a 5-diphenyl-2-imidazole thiol, 2-mercaptoimidazole, 1-ethyl-2-mercaptobenzimidazole, 2-mercapto quinoline, 8-6 mercaptopurine, 2-mercapto-4(3H)-chinae-cortex ZORINON, A 7-trifluoromethyl-4-quinoline thiol, 2 and 5, a 6-tetra-chloro-4-pyridine thiol, A 4-amino-6-hydroxy-2-mercaptopyrimidine MONOHIDO rate, 2-amino-5-mercapto - 1, 3, 4-thiadiazole, 3-amino-5-mercapto - 1, 2, 4-triazole, 4-HIDOKIROSHI-2-mercaptopyrimidine, 2-mercaptopyrimidine, 4, 6-diamino-2-mercaptopyrimidine, 2-mercapto-4-methylpyrimidine hydrochrolide, 3-mercap 5-phenyl - 1, 2, 4-triazole, 1-phenyl-5-mercapto tetrazole, 3 -(5-mercapto tetrazole)- Although benzenesulfonic acid sodium, N-methyl-N'-{3-(5-mercapto tetra-ZORIRU) phenyl} urea, 2-mercapto-4-phenyl oxazole, etc. are mentione this invention is not limited to these.

[0223] As an addition of these mercapto compounds, the range of 0.0001-1.0 mols per one mol of silver is 0.001-0.3 mols per mol in silver amount desirable still more preferably in an emulsion layer.

[0224] A fatty acid given in polyhydric alcohol (for example, the glycerol and diol of a class which were indicated b U.S. Pat. No. 2,960,404), U.S. Pat. No. 2,588,765, and 3,121,060 or ester, the silicone resin of a British patent [No. 955,061] publication, etc. can be used for the photosensitive layer in this invention as a plasticizer and lubricant.

[0225] In this invention, it is desirable to prepare a protective layer on an image formation layer, and it is desirable a binder of a protective layer that glass transition temperature uses the latex of 25-degree-C or more polymer 70 degree C or less as mentioned above. In this case, it is desirable to use the desirable above-mentioned polymeric latex as 70 of the weight or more 50% of the weight or more of all the binders of a protective layer. It is desirable to prepare at least one layer of such protective layers in this invention. It is the same as that of an image formation layer about a binder configuration, the painting method, etc. of such a protective layer. as polymeric latex for protective layers, the polymeric latex of acrylic, a styrene system, an acrylic / styrene system, a vinyl chloride system, and a vinylidene-chloride system uses preferably -- having -- concrete -- VONCORT of an acrylic resin system R -- 3370, 4280, and Nipol Nipol G576 of Lx857, methyl (meta) acrylate / 2-ethylhexyl (meta) acrylate / hydroxyethyl (meta) acrylate / styrene / (meta) acrylic-acid copolymer, and vinyl chloride resin and Aron D5071 of vinylidene chloride resin are us preferably.

[0226] the total amount of binders for protective layers used for this invention -- 0.2 - 5.0 g/m2 -- it is the range of 0.4.0 g/m2 more preferably.

[0227] What kind of antisticking material may be used as a surface-protection layer of this invention. As an example an antisticking material, a wax, a silica particle, a styrene content elastomer nature block copolymer (for example, styrene-styrene butadiene rubber, styrene-isoprene-styrene), cellulose acetate, cellulose acetate butylate, cellulose propionate, such mixture, etc. exist. Moreover, in a surface-protection layer, the surfactant for the cross linking agent for bridge formation and spreading nature amelioration etc. may be added.

[0228] Light absorption material and a filter color which are indicated by U.S. Pat. No. 3,253,921, 2,274,782, 2,527,583, and 2,956,879 can be used for the protective layer of the image formation layer in this invention, or an image formation layer. Moreover, a color can be mordanted, for example like a publication to U.S. Pat. No. 3,282,69. As amount of the filter color used, 0.1-3 have a desirable absorbance in exposure wavelength, and 0.2-especially 1.5 are desirable.

[0229] Various colors and a pigment can be used for the photosensitive layer of this invention from a viewpoint of color tone amelioration and irradiation prevention. Although what kind of thing is sufficient as the color and pigment which are used for the photosensitive layer of this invention, there are a pigment and a color given in a Color Index, example, and organic pigments including a pyrazolo azole color, anthraquinone dye, azo dye, an azomethine color, an oxo-Norian color, a carbocyanine color, a styryl color, triphenylmethane dye, India aniline dye, indophenol dye, and phthalocyanine, an inorganic pigment, etc. are specifically mentioned. As a desirable color used for this invention, anthraquinone dye (for example, compound 3-6-18, 3-23-38, etc.), [the compounds 1-9 given in JP,5-341441,A and given in JP,5-165147,A] An azomethine color (compounds 17-47 given in JP,5-341441,A etc.), India aniline dye (For example, compound 2-10-11 [the compounds 11-19 given in JP,5-289227,A, the compound 47 given in JP,5-341441,A, and given in JP,5-165147,A] etc.) And azo dye (compounds 10-16 given in JP,5-341441,A) is mentioned. As an addition method of these colors, what kind of method is sufficient as the condition that mordanting was carried out to the solution, the emulsification object, the solid-state particle distribution object, and the macromolecule mordant etc. Although the amount of these compounds used is decided with the target absorbed amount, it is desirable to use of sensitized materials generally in 1×10^{-6} or more g [per two] 1g or less.

[0230] As for the heat developing photograph photosensitivity material in this invention, it is desirable that it is the so called one side sensitive material which has the photosensitive layer which contains the silver halide emulsion of at least one layer in one base material side, and has a back layer in another side.

[0231] As for a back layer, in this invention, it is desirable that the maximum absorption in the range of desired is 2.0 or less [about 0.3 or more]. When the range of desired is 750-1400nm, it is desirable that the optical density in 750-360nm is the antihalation layer in which that it is [or more 0.005] less than 0.5 has or more 0.001 less than 0.3 optical density desirable still more preferably. When the range of desired is 750nm or less, the maximum absorption of the request range before image formation is 2.0 or less [0.3 or more], and it is desirable that it is the antihalation layer from which the optical density of 360-750nm after image formation becomes less than [0.005 or more] 0.3 further. Although there is especially no limit as a method of lowering the optical density after image formation to the above-mentioned range, the method of reducing the concentration by the color by the discharge by heating as indicated by the Belgium patent No. 733,706, for example, the method of reducing concentration to JP,54-17833,A by the discharge by the optical exposure of a publication, etc. are mentioned.

[0232] When using an antihalation color by this invention, it may have absorption of the purpose in the desired range as for this color, there may be enough little absorption in a visible region after processing, and as long as the configuration of an absorbance spectrum with the above-mentioned desirable back layer is acquired, what kind of compound is sufficient as it. For example, although the next thing is indicated, this invention is not limited to this. A independent color, JP,59-56458,A, JP,2-216140,A, 7-13295, 7-11432, a U.S. Pat. No. 5,380,635 number publication, From the 13th page lower left column of the 1st line of JP,2-68539,A to this 14th page lower left column of the 9th line There is a compound given [this] in the 16th page lower right column from the 14th page lower left column of a 3-24539 official report. As a color decolorized by processing, JP,52-139136,A, 53-132334, 56-501480, 16060, 57-68831, 57-101835, 59-182436, JP,7-36145,A, There are 7-199409, JP,48-33692,B, 50-16648, JP,2-41734 a U.S. Pat. No. 4,088,497 number, said 4,283,487 numbers, said 4,548,896 numbers, and said 5,187,049 numbers.

[0233] In this invention, the binder with a suitable back layer is transparent or translucent. Generally it is colorless. Natural polymer synthetic resin, polymer, and a copolymer, In addition, data medium which forms a film, for example gelatin, gum arabic, Pori (vinyl alcohol), hydroxyethyl cellulose, cellulose acetate, Cellulose acetate butylate, Pori (vinyl pyrrolidone), casein, Starch, Pori (acrylic acid), Pori (methyl methacrylic acid), Pori (vinyl chloride), Pori (methacrylic acid), copoly (styrene-maleic anhydride), copoly (styrene-acrylonitrile), Copoly (styrene-butadiene) and Pori (vinyl acetal) For example, (Pori (vinyl formal) and Pori (vinyl butyral)), There are Pori (ester), Pori (urethane), phenoxy resin, Pori (vinylidene chloride), Pori (epoxide), Pori (carbonate), Pori (vinyl acetate), cellulose ester, and P (amide). A binder may carry out covering formation from water, an organic solvent, or an emulsion.

[0234] The one side sensitive material in this invention may add a mat agent in the surface-protection layer of the surface-protection layer of a photosensitive emulsion layer and/or a back layer, or a back layer for conveyance nature

amelioration. Generally a mat agent is organic [of insolubility / water], or the particle of an inorganic compound. as mat agent -- the thing of arbitration -- it can be used -- for example, U.S. Pat. No. 1,939,213 -- said -- No. 2,701,245 -- said -- No. 2,322,037 -- said -- No. 3,262,782 -- said -- No. 3,539,344 -- said -- an organic mat agent given in each specification, such as No. 3,767,448, -- said -- No. 1,260,772 -- said -- No. 2,192,241 -- said -- No. 3,257,206 -- said -- No. 3,370,951 -- said -- No. 3,523,022 -- said -- what was known well can be used for each specification, such as No. 3,769,020, in this industry, such as an inorganic mat agent of a publication, for example, as an example of the organic compound which can specifically be used as a mat agent As an example of a water-dispersion vinyl polymerization object, polymethyl acrylate, polymethylmethacrylate, A polyacrylonitrile and acrylonitrile-alpha-methyl-styrene copolymer, A polystyrene and styrene-divinylbenzene copolymer, polyvinyl acetate, As an example of a cellulosic, polyethylene carbonate, polytetrafluoroethylene, etc. Methyl cellulose, Cellulose acetate, cellulose acetate propionat etc., Gelatin, hardening gelatin which carried out coacervate hardening and which was made into very small capsule hollow grain hardened as an example of a starch derivative with well-known curing agents, such as carboxy starch, carboxy nitrophenyl starch, and a urea-formaldehyde-starch reactant, can be used preferably. the silver chloride desensitized as an example of an inorganic compound by a silicon dioxide, a titanium dioxide, diacid-ized magnesium the aluminum oxide, the barium sulfate, the calcium carbonate, and the well-known method -- similarly a silver bromide, glass, diatomaceous earth, etc. can be used preferably. The above-mentioned mat agent can mix and use the material of a class different if needed. There is especially no limitation in the magnitude of a mat agent, and a configuration, and it can use the thing of the particle size of arbitration for them. It is desirable to use a thing with a particle size of 0.1 micrometers - 30 micrometers on the occasion of operation of this invention. Moreover, the particle size distribution of a mat agent may be narrow, or may be large. On the other hand, since a mat agent influences Hay of a sensitized material, and surface gloss greatly, it is desirable to change particle size, a configuration, and particle size distribution into the condition as occasion demands by mixing of the time of mat agent production or two or more mat agents.

[0235] In this invention, a desirable mode adds a mat agent in a back layer, as whenever [mat / of a back layer], 120 or less seconds, 10 seconds or more are desirable still more desirable, and the Beck smoothness is 50 seconds or more 700 or less seconds.

[0236] In this invention, as for a mat agent, it is desirable to contain in the layer which functions as the outermost surface layer or the outermost surface layer of sensitive material, or the layer near an outside surface, and it is desirable to contain in the layer which acts as the so-called protective layer. Moreover, although the method of **** is sufficient as whenever [mat / of an emulsion side protective layer] if **** failure does not arise, 10,000 or less seconds has the desirable Beck smoothness 500 seconds or more, and 2,000 or less seconds is desirable especially 500 seconds or more

[0237] The emulsion for heat developing photographs used for this invention consists of 1 or a layer beyond it on a base material. Much more configuration must contain the material of the addition by the request of organic silver salt silver halide, a developer, a binder and a color tone agent, a covering assistant, other adjuvants, etc. The configuration of a bilayer must contain some of other components in the 2nd layer or both layers including organic silver salt and a silver halide in the 1st emulsion layer (layer which usually adjoined the base material). However, the configuration of the bilayer which comes to contain the single emulsion layer and protection topcoat containing all components is also considered. The configuration of a multicolor photosensitivity heat developing photograph material may contain all components in the monolayer as you may include the combination of these bilayers about each color and it is indicated by U.S. Pat. No. 4,708,928. In the case of a charge of polychromatosis multicolor photosensitivity heat developing photograph material, generally, by using the barrier layer of functionality or non-functionality between each emulsion layer (photosensitive layer), each emulsion layer of each other is distinguished and is held as indicated by U.S. Pat. No. 4,460,681.

[0238] A rear-face resistance heating layer (backside resistive heating layer) as shown in U.S. Pat. No. 4,460,681 and 4,374,921 can also be used for a photosensitive heat developing photograph system.

[0239] A hardening agent may be used for each class, such as a photosensitive layer of this invention, a protective layer, and a back layer. The vinyl sulfone system compounds indicated by the epoxy compounds indicated by the polyisocyanates indicated by a U.S. Pat. No. 4,281,060 number, JP,6-208193,A, etc., the U.S. Pat. No. 4,791,042 number etc. as an example of a hardening agent, JP,62-89048,A, etc. are used.

[0240] A surfactant may be used for this invention for the purpose of spreading nature, electrification amelioration, etc. As an example of a surfactant, anythings, such as the Nonion system, an anion system, a cation system, and a fluorine system, are used suitably. Specifically, polyalkylene oxide, an anion system surfactant, etc. of a publication are mentioned to a polysiloxane system surfactant given in a fluorochemical surfactant given in a fluorine system high molecular surface active agent given in JP,62-170950,A, a U.S. Pat. No. 5,380,644 number, etc., JP,60-244945,A, JP,63-188135,A, etc., a U.S. Pat. No. 3,885,965 number, etc., JP,6-301140,A, etc.

[0241] The photographic emulsion for heat developing in this invention can be made to cover on various base material

generally, a typical base material -- polyester film, under coat polyester film, the Pori (ethylene terephthalate) film, a polyethyleneterephthalate film, a nitric-acid cellulose film, a cellulose ester film, the Pori (vinyl acetal) film, and a polycarbonate film -- and or it is related, a resin-like material and glass, paper, a metal, etc. are included. A flexible base material and the base material the coat was especially carried out [the base material] by the polymer of the α -olefin of the carbon numbers 2-10, such as a butyrene and/or α -olefin polymer [which was acetylated partially] especially polyethylene, polypropylene, and ethylene-butene copolymer, are used typically. A transparent thing is desirable, although this base material may be transparent or it may be opaque. Especially the about 75-200-micromet polyethylene terephthalate (PET) that carried out biaxial extension is desirable also among these.

[0242] On the other hand, if it lets it pass to the heat developing machine of processing of plastic film of 80 degrees or more, generally the size of a film expands and contracts. When using the material after processing as a printing platemaking use, this telescopic motion poses a serious problem, when performing precision process printing.

Therefore, it is desirable to use the small film of a dimensional change which was made to ease internal distortion which remains in a film in this invention at the time of biaxial stretching, and carried out the work which loses heat shrink distortion generated during heat developing. For example, before applying the photographic emulsion for heat developing, the polyethylene terephthalate heat-treated in 100 degrees C - 210 degrees C is used preferably. What has high glass transition temperature is desirable, and can use a polyether ethyl ketone, polystyrene, polysulfone, polyethersulfone, polyarylate, a polycarbonate, etc.

[0243] The heat developing sensitive material in this invention may have a layer containing the tin-oxide particle indicated by insoluble mineral salt like the publication to the ionicity polymer or U.S. Pat. No. 3,428,451 like the publication to the vacuum evaporation metal layer for electrification prevention (for example, a chloride, a nitrate, etc.) (for example, fusibility salts), U.S. Pat. No. 2,861,056, and 3,206,312, JP,60-252349,A, and 57-104931.

[0244] As a method of obtaining a color picture using the heat developing sensitive material in this invention, the method of a publication is [11 left columns / of the 40th line] from the JP,7-13295,A 10 page left column of the 43rd line. Moreover, it is illustrated by the British patent No. 1,326,889, U.S. Pat. No. 3,432,300, 3,698,909, 3,574,627, 3,573,050, 3,764,337, and 4,042,394 as a stabilizer of a color image.

[0245] The heat developing photographic emulsion in this invention can be covered with the various coating actuation including dip coating, air knife coating, flow coating, or the extrusion coating that uses the hopper of the class of publication for U.S. Pat. No. 2,681,294. Two-layer or the layer beyond it can be covered with the method of a U.S. Pat. No. 2,761,791 and British patent [No. 837,095] publication by request to coincidence.

[0246] A known primer layer etc. can be included in an opacification layer, a protection topcoat layer, and light-and-heat photograph technology in case the color acceptance layer for receiving, additional layer, for example, migration color image, and reflective printing are desired in the heat developing sensitive material in this invention. As for the sensitive material of this invention, it is desirable that image formation can be carried out with the one sensitized material, and it is desirable not to become sensitized material with another functional layer required for image formation, such as a television layer.

[0247] Generally the aligner used for image Mr. exposure in this invention is laser diode, although any are sufficient long as the exposure time is equipment which can expose less than 10 to 7 seconds. Laser Diode (LD), light emitting diode Light Emitting Diode (LED) for the light source is used preferably. Especially LD is more desirable in respect of high power and high resolution. As long as these light sources can generate the light of the electromagnetic wave spectrum of the purpose wavelength range, any are sufficient as them. For example, if it is LD dye laser, gas laser, solid state laser, semiconductor laser, etc. can be used.

[0248] Exposure of this invention makes the light beam of the light source overlap, and is exposed, and it says that the vertical-scanning pitch of overlap is smaller than a beam diameter. Overlap is FWHM / vertical-scanning pitch, when beam diameter is expressed with the half-value width (FWHM) of beam reinforcement. (overlap factor) It can express quantitatively.

[0249] It is desirable that this overlap coefficient is 0.2 (1 or less [Preferably]) or more in this invention.

[0250] Especially limitation does not have the scanning mode of the light source of the aligner used for this invention and a cylinder external surface scanning mode, a cylinder inside scanning mode, a plane scanning mode, etc. can be used. Moreover, although a single channel or a multichannel is sufficient as the channel of the light source, in the case of a cylinder external surface method, a multichannel is used preferably.

[0251] The heat developing sensitive material of this invention has low Hayes at the time of exposure, and is in the orientation which an interference fringe tends to generate. The technology of carrying out ON light of the laser light currently indicated by JP,5-113548,A etc. aslant to sensitive material as this interference fringe generating prevention technology, and the method of using the multimode laser currently indicated by the international patent WO 95/No. 01754 etc. are learned, and it is desirable to use such technology.

[0252] Although negatives may be developed by what kind of method, the heating development production process of the image formation method of this invention carries out the temperature up of the sensitive material usually exposed

image WAIZU, and is developed. as the type of the heat developing machine of the JP,5-56499,B, the patent official report No. 684453, JP,9-292695,A, JP,9-297385,A, and international patent [WO 95/No. 30934] publication as a type which contacts heat developing sensitive material in the heat source of a heating roller, a heat drum, etc. as a desirable mode of the heat developing machine used, and a non-contact mold -- JP,7-13294,A and the international patent WO 97/No. 28489 -- said -- No. 97/28488 -- and -- said -- there is [of No. 97/28487] a heat developing machine of a publication. As an especially desirable mode, it is the heat developing machine of a non-contact mold. As a desirable development temperature, it is 80-250 degrees C, and is 100-140 degrees C still more preferably. As developing time - 180 seconds is desirable, and 10 - 90 seconds is still more desirable.

[0253] As an image does not come out, after heating 5 seconds or more at 80-degree-C or more temperature of less than (preferably 113 degrees C or less) 115 degrees C as a method of preventing the processing nonuniformity by the dimensional change at the time of the heat developing of the heat developing sensitive material of this invention, the method (the so-called multistage story heating method) of carrying out heat developing and carrying out image formation below 110 degrees C or more 140 degrees C, is effective.

[0254] The example of 1 configuration of the heat developing machine used for heat developing processing of the heat developing sensitive material of this invention is shown in drawing 1. Drawing 1 shows the side elevation of a heat developing machine. the heat developing machine of drawing 1 -- the heat developing sensitive material 10 -- a planar correction and the carrying-in roller pair carried in to a heating unit while carrying out preheating -- the taking-out roller pair taken out from a heating unit while correcting the heat developing sensitive material 10 after the heat developing after 11 (a lower roller is a heating roller) and heat developing to a plane -- it has 12. the heat developing sensitive material 10 -- a carrying-in roller pair -- heat developing is carried out while being conveyed from 11 to taking-out roller pair 12. Two or more rollers 13 are installed in the side which the field where a conveyance means to convey the heat developing sensitive material 10 under this heat developing has an image formation layer contacts, at the smooth side 14 where the nonwoven fabric (for example, it consists of a polyphenylene acetylene or Teflon) etc. was stuck is installed in the side which the back side of that opposite side contacts. A back side slides on the smooth side 14 top, and the heat developing sensitive material 10 is conveyed by the drive of two or more rollers 13 in contact with the field which has an image formation layer. The heating heater 15 is installed so that a heating means may be heated by the upper part of a roller 13, and the lower part of the smooth side 14 from both sides of the heat developing sensitive material 10. A tubular heater etc. is mentioned as a heating means in this case. Although the path clearance of a roller 13 and the smooth side 14 changes with members of a smooth side, it is suitably adjusted to the path clearance which can convey the heat developing sensitive material 10. It is 0-1mm preferably.

[0255] Although it is good anything if the quality of the material of the surface of a roller 13 and the member of the smooth side 14 have elevated-temperature endurance and there is no trouble in conveyance of the heat developing sensitive material 10, the member of silicone rubber and a smooth side has [the quality of the material on the surface of a roller] a desirable nonwoven fabric made from a polyphenylene acetylene (PPS) or Teflon (PTFE). It is desirable to set up heating temperature freely using two or more heaters, respectively as a heating means.

[0256] in addition, a heating unit -- a carrying-in roller pair -- although it consists of the preheating section A which has 11, and the heat developing processing section B equipped with the heating heater 15, the preheating section A of the upstream of the heat developing processing section B is a temperature [lower (for example, low about 10-30 degrees C) than heat developing temperature] higher than the glass transition temperature (Tg) of the base material of the heat developing sensitive material 10, and it is desirable to set up so that development nonuniformity may not come out.

[0257] moreover, a guide plate 16 installs in the lower stream of a river of the heat developing processing section B having -- a taking-out roller pair -- the annealing section C which has 12 and a guide plate 16 is installed. The material of a guide plate with low thermal conductivity is desirable, and it is desirable to perform cooling gradually.

[0258] As mentioned above, although explained according to the example of illustration, the heat developing machine used for this inventions, such as a thing given not only in this but JP,7-13294,A, may be the thing of various configurations. Moreover, in the above equipments, in the case of the multistage heating method preferably used in this invention, two or more heat sources from which heating temperature differs are installed, and it should just heat them continuously different temperature.

[0259]

[Example] Although the effect of this invention is explained with an example below, this invention is not limited to this.

[Example 1] <<silver halide emulsion preparation>>

In 700ml of water, FUTARU-ized gelatin 11g and 30mg of potassium bromides, ((A) Emulsion) After dissolving benzene thiosulfonic acid sodium 10mg and doubling pH with 5.0 at the temperature of 40 degrees C, Keeping 159m of aqueous solutions containing 18.6g of silver nitrates, and the aqueous solution which contains [a potassium bromide] 5xten - six mols [l.] /, and K3IrCl6 for one-mol [l.] (NH4) 2RhCl5 (H2O) by l. in 2xten - five mols /at Ag7.7 With the control double jet process, it applied for 6 minutes and 30 seconds, and added. Subsequently, keep

476ml of aqueous solutions containing 55.5g of silver nitrates, and the haloid salt aqueous solution which contains 0.1 mol [1.] and K3IrCl6 for a potassium bromide by 1. in 2xten - five mols /at pAg7.7, with the control double jet process, it applied for 28 minutes and 30 seconds, and added. flocking settling of the pH is lowered and carried out after that -- making -- demineralization processing -- carrying out -- compound A -- 0.17g and deionization gelatin (2 ppm or less as calcium content) 23.7g -- in addition, it adjusted to pH5.9 and pAg8.0. The obtained particle was a cu particle of the average grain size of 0.08 micrometers, 9% of projected-area coefficient of variation, and 90% of field (100) ratios.

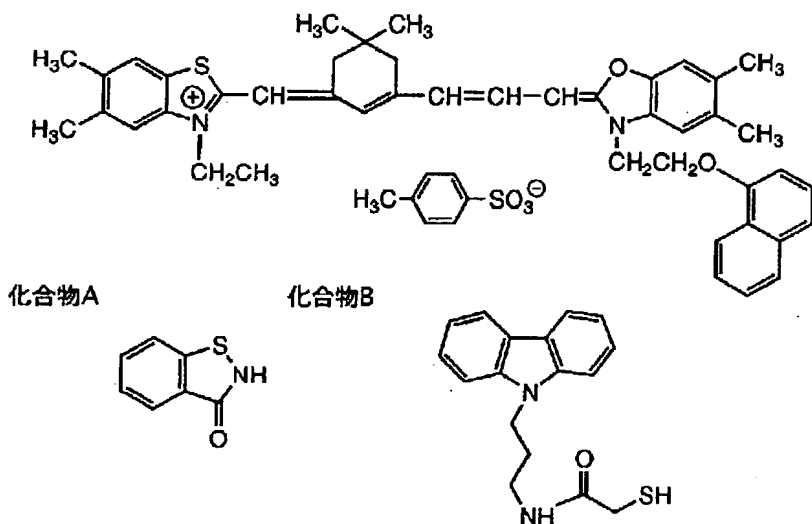
[0260] In this way, the temperature up of the obtained silver halide particle is carried out to 60 degrees C, a benzene thiosulfonic acid sodium 76micro mol is added per one mol of silver, 154micro mol of sodium thiosulfates is added after 3 minutes, and it ripens for 100 minutes, and is 4-hydroxy-6-methyl. - After adding 1, 3, 3a, and 5x10 - 4 mols of 7-TETORAZA indenes, 40 degrees C was made to lower the temperature.

[0261] Then, temperature was kept at 40 degrees C, it added, agitating the 12.8xten - four mols following sensitizing dye A, and the 6.4xten - three-mol compound B to one mol of silver halides, and after 20 minutes, it quenched at 30 degrees C and preparation of the silver halide emulsion A was ended.

[0262]

[Formula 29]

増感色素A



[0263] <<organic-acid silver distribution object preparation->>

Mixed 6.1g [of <organic-acid silver A> arachin acid], 37.6g [of behenic acid], 700ml [of distilled water], and tert-butanol 70ml, and 123ml of 1 N-NaOH aqueous solutions, and stir for 1 hour, it was made to react at 75 degrees C, and the temperature was lowered at 65 degrees C. 112.5ml of subsequently, aqueous solutions of 22g of silver nitrates It added over 45 seconds, and was left for 5 minutes as it is, and the temperature was lowered at 30 degrees C. Then, so content was carried out the ** exception by suction filtration, and solid content was rinsed until the conductivity of filtered water became 30microS/cm. In this way, the obtained solid content was dealt with as a wet cake without making it dry, it added polyvinyl alcohol (trade name-VA-217) 7.5g and water to the wet cake of 100g of desiccation solid content, and after it set the amount of whole to 500g, it carried out preliminary distribution in the homomixer.

[0264] Next, the pressure of a disperser (trade name: Micro fluidizer M-110 S-EH, made in a micro sieve DEKKUSU International corporation, G10Z interaction chamber use) was adjusted to 1750kg/cm², the undiluted solution [finishing / preliminary distribution] was processed 3 times, and the organic-acid silver distribution object A was obtained. In this way, the organic-acid silver granule child contained in the obtained organic-acid silver distribution object was a needlelike particle of the average minor axis of 0.04 micrometers, the average major axis of 0.8 micrometers, and 30% of coefficient of variation. Measurement of grain size was performed in MasterSizerX made from Malvern Instruments Ltd. Cooling actuation equipped with the coil heat exchanger respectively before and after the interaction chamber, and it was set as a desired distributed temperature by adjusting the temperature of a refrigerator. In this way, behenic acid silver content % [% of 85 mols] organic-acid silver A was prepared.

[0265] As opposed to 3, 5, and 5-trimethyl hexane 20g <<1 and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) - preparation>> of the solid-state particle distribution object of a 3, 5, and 5-trimethyl hexane -- 1 and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) - 3.0g and 77ml of water could be added, MP-203 of MP polymer by Kuraray Co., L were stirred, and it was left as a slurry for 3 hours. Then, 360g of 0.5mm zirconia beads was prepared, and it put into a vessel together with the slurry, and distributed for 3 hours in the disperser (1 / 4G Sand-grinder mill: product made from eye MEKKUSU), and the reducing-agent solid-state particle distribution object was prepared. 80% of the weight

of the particle of particle diameter was 0.3 micrometers or more 1.0 micrometers or less.

[0266] Preparation>> of the solid-state particle distribution object of <<tribromonethyl phenylsulfone To tribromonethyl phenylsulfone 30g, it was easy to add, hydroxypropyl-methylcellulose 0.5g, compound C0.5g, and 88.5g of water were stirred, and it was left as a slurry for 3 hours. Then, it wore like preparation of a reducing-agent solid-state particle distribution object, and the solid-state particle distribution object of an inhibitor was prepared. 80 of the weight of the particle of particle diameter was 0.3 micrometers or more 1.0 micrometers or less.

[0267] Preparation>> of <<emulsion layer spreading liquid To one mol of silver of the organic-acid silver microcrystalline distribution object created above, the following binders, the material, and the silver halide emulsion A were added, water was added, and it considered as emulsion layer spreading liquid.

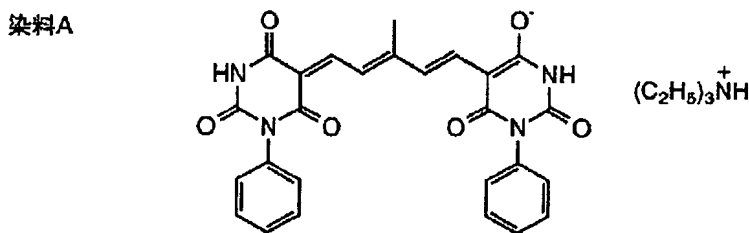
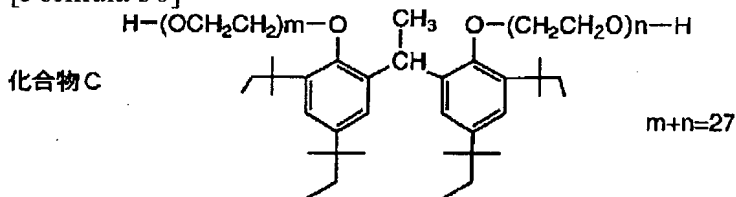
Binder; rack star 3307B As solid content 406g (being [Dainippon Ink & Chemicals, Inc. make;] an SBR latex glass transition temperature of 17 degrees C)

1 and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) - 3, 5, and 5-trimethyl hexane As solid content 119g tribromonethyl phenylsulfone As solid content 21.6g benzene thiosulfonic acid sodium 0.44g benzotriazol 1.25g polyvinyl alcohol (MP[by Kuraray Co., Ltd.]- 203) 20g 6-iso-butyl phthalazine 0.10-mol alt.phosphoric acid 2 hydrogen sodium Compound of 0.13g types (B) A class and an amount (mol) given in a table 1

***** A class and an amount (mol) given in a table 1

Color A Coverage silver halide emulsion A with which the optical density of 783nm is set to 0.3 It is a 0.05-mol pH regulator as an amount of Ag. Class given in a table 1 [0268]

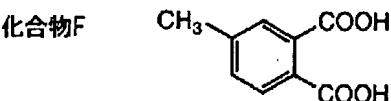
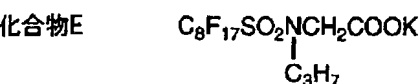
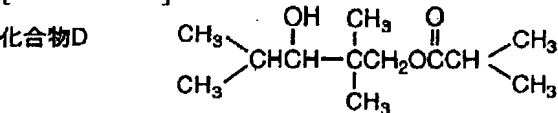
[Formula 30]



[0269] Preparation>> of <<emulsion side protective layer spreading liquid Polymeric latex of methyl methacrylate / styrene / 2-ethylhexyl acrylate / 2-hydroxyethyl methacrylate / acrylic-acid =59/9/26/5/1 (wt%) (the glass transition temperature of 54 degrees C with a copolymer) Add Compound D as solid content concentration, and H2O is added 15wt%102g as a film formation assistant 44wt(s)%. 1.89g of carnauba wax (product [made from Chukyo Fats and oils], cello ZORU 524) 30wt% solutions, Compound E 0.188g, the organic-acid compound of a formula (A) (a class and an amount given in a table 1), a mat agent (a polystyrene particle, mean particle diameter of 7 micrometers) -- 0.56g and polyvinyl alcohol (Kuraray Co., Ltd. make, PVA-235) 0.4g -- adding -- further -- H2O -- in addition, spreading liquid was considered as preparation.

[0270]

[Formula 31]



0271 Cre ti n f the E b se m teri l which <<b ck / under c t tt ched>>

(1) According to the conventional method, PET of IV (intrinsic viscosity) = 0.66 (a phenol/tetrachloroethane = inside 6/4 (weight ratio) 25 degrees C measurement) was obtained using a base material terephthalic acid and ethylene glycol. After pelletizing this, it dried at 130 degrees C for 4 hours, and extruded and quenched from T mold die after melting 300 degrees C, and an unstretched film of thickness with which the thickness after heat setting is set to 120 micrometers was created.

[0272] The roll with which peripheral speed differs this was used, and it was length-extending 3.3 times, and was ranking next to them, and horizontal extension was carried out 4.5 times by the tenter. The temperature at this time was 110 degrees C and 130 degrees C, respectively. Then, it eased 4% in the longitudinal direction at the same temperature as this after heat setting for 20 seconds by 240 degrees C. Then, after carrying out the slit of the chuck section of a tenter, NARU processing was performed to both ends and it rolled round by 4.8kg/cm². Thus, the roll with width of face of 2.4m, a length [of 3500m], and a thickness of 120 micrometers was obtained.

[0273]

(2) Under coat (a) polymeric latex - ** (styrene / butadiene / hydroxyethyl methacrylate / divinylbenzene = 67/30/2.5/ (% of the weight)) 160mg/m², 4-dichloro-6-hydroxy-s-triazine 4 mg/m² mat agent (polystyrene, mean particle diameter of 2.4 micrometers) 3 mg/m² [0274]

(3) Under coat (b) deionization processing gelatin (the calcium²⁺ content of 0.6 ppm, jelly strength of 230g) 50 mg/ [0275]

(4) Conductive layer JURIMA ET-410 (Nippon Junyaku make) 96 mg/m² alkali-treatment gelatin (molecular weight 10000 [about] and calcium²⁺ content of 30 ppm) 42 mg/m² deionization processing gelatin (calcium²⁺ content of ppm) 8 mg/m² Compound A 0.2 mg/m² Polyoxyethylene phenyl ether 10 mg/m² Sumitex resin M-3 (a water-soluble melamine compound, Sumitomo Chemical Co., Ltd. make) 18 mg/m² Color A the coverage SnO₂/Sb (9/1-fold quantitative ratio, a needlelike particle, and a major axis / minor-axis = 20-30 --) from which the optical density of 783nm is set to 1.2 Ishihara Sangyo Kaisha, Ltd. make 160mg/[m] 2 mat agent (polymethylmethacrylate, mean particle diameter of 5 micrometers) 7 mg/m² [0276]

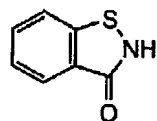
(5) Protective layer polymeric latex - ** (Methyl methacrylate / styrene / 2-ethylhexyl acrylate / 2-hydroxyethyl methacrylate / acrylic acid = 59/9/26/5/1 (% of the weight of copolymer)) 1000mg/[m] 2 polystyrene-sulfonate salt (molecular weight 1000-5000) 2.6 mg/m² cello ZORU 524 (Chukyo Fats and oils) 25 mg/m² Sumitex resin M-3 (a water-soluble melamine compound, Sumitomo Chemical Co., Ltd. make) 218 mg/m² [0277] Sequential spreading of an under coat (a) and the under coat (b) was carried out at one side of a base material, and 180 degrees C dried for 4 minutes, respectively. Subsequently, sequential spreading of a conductive layer and the protective layer was carried out in the field of the opposite side which applied the under coat (a) and the under coat (b), and 180 degrees C of PET base materials which dried for 30 seconds and the back/under coat attached were created, respectively.

[0278] Thus, the PET base material which the created back/under coat attached was put into the overall-length heat treatment zone of 30m set up 150 degrees C, and self-weight conveyance was carried out by part for tension 14 g/cm and 20m/of bearer rates. Then, it rolled round by through one and the rolling-up tension of 10kg/cm² for 15 seconds the 40-degree C zone.

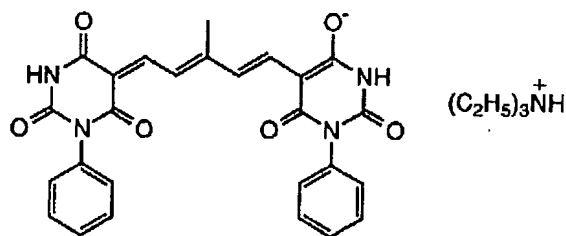
[0279]

[Formula 32]

化合物A



染料A



[0280] Preparation>> of <<heat developing sensitive material On the under coat of the PET base material of the side which applied said under coat (a) and under coat (b), the aforementioned emulsion layer spreading liquid was applied so that it might become spreading silver content 1.7 g/m². Furthermore, on it, coincidence multistory spreading of sa

emulsion side protective layer spreading liquid was carried out with emulsion spreading liquid so that the coverage of the solid content of polymeric latex might be set to 3.0g/m².

[0281] Evaluation [of <<photograph engine performance >>]

(Exposure processing) The laser aligner of the single channel cylinder inside method which carried semiconductor laser with the beam diameter (one half of FWHM of beam reinforcement) of 12.56 micrometers, 50mW [of laser outputs and an output wavelength of 783nm for the obtained heat developing sensitive material was used, and by changing a output value for the exposure time by changing the rotational frequency of a mirror, light exposure was adjusted and exposed in 2x 10 to 8 seconds. It was made the overlap factor 0.449 at this time.

[0282] (Heat developing processing) Using the heat developing machine of drawing 1 , the quality of roller facing of the heat developing processing section was used into silicone rubber, the smooth side used heat developing sensitive material [finishing / exposure] as the PPS nonwoven fabric, and 120 degrees C of heat developing processing section performed heat developing processing for 20 seconds for 5 seconds at 90-100 degrees C of preheating sections. In addition, a crosswise temperature precision was ± 1 degree C.

[0283] (Evaluation of the photograph engine performance) Macbeth TD904 concentration meter (visible concentration) estimated the obtained image. Change of Dmin, Dmax, gamma (contrast), and network % estimated the result of measurement. gamma was expressed with the slope of a line which connects the point of concentration 0.2 and 2.5 by setting a horizontal axis as the logarithm of light exposure. Moreover, about evaluation of shelf life, heat developing sensitive material was saved at 50 degrees C and 75% of humidity RH on the 3rd, aforementioned exposure and heat developing processing were performed after that, and Dmin and Dmax were evaluated.

[0284] The result of having carried out the above-mentioned evaluation about each heat developing sensitive material shown in a table 1.

[0285]

[A table 1]

熱現像 感光材料	式(A)の化合物		式(B)の化合物		pH調節 剤種	膜面 pH	造液剤 種類	添加量 (モル)	Dmin	Dmax	γ (コントラスト)	50°C、75%RH、3 E ₂ 保存後の性能	
	種類	添加量 (モル)	種類	添加量 (モル)								Dmin	Dmax
1	—	—	—	—	NH ₄ OH	6.8	—	—	0.11	0.11	評価できず	0.11	0.11
2	A-2	1.4×10^{-3}	—	—	NH ₄ OH	5.2	—	—	0.12	1.6	評価できず	0.14	1.6
3	(本発明)	0.7×10^{-3}	—	—	NH ₄ OH	5.8	—	—	0.14	3.9	7	0.16	4.2
4	(本発明)	1.4×10^{-3}	—	—	NH ₄ OH	5.2	C-62	3×10^{-2}	0.15	4.4	10	0.18	4.7
5	(本発明)	2.1×10^{-2}	—	—	NH ₄ OH	4.9	C-62	3×10^{-2}	0.14	4.6	12	0.17	4.7
6	(本発明)	1.4×10^{-3}	B-26	1.1×10^{-2}	NH ₄ OH	5.2	C-62	3×10^{-2}	0.14	4.3	9	0.15	4.7
7	(本発明)	1.4×10^{-3}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-62	3×10^{-2}	0.13	4.2	8	0.13	4.6
8	(本発明)	2.1×10^{-3}	B-26	2.3×10^{-3}	NH ₄ OH	4.9	C-62	3×10^{-2}	0.13	4.5	12	0.13	4.6
9	(本発明)	1.4×10^{-3}	B-26	2.3×10^{-3}	NH ₄ OH	5.8	C-62	3×10^{-2}	0.13	4.0	7	0.17	4.6
10	A-2	1.4×10^{-3}	B-26	2.3×10^{-3}	NH ₄ OH	6.2	C-62	3×10^{-2}	0.13	3.7	5	0.20	4.6
11	A-2	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	6.5	C-62	3×10^{-2}	0.14	3.4	4	0.32	4.6
12	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NaOH	5.2	C-62	3×10^{-2}	0.13	4.0	7	0.18	4.0
13	A-2	1.4×10^{-2}	B-26	2.3×10^{-3}	NaOH	6.2	C-62	3×10^{-2}	0.15	3.6	4	1.0	8.6
14	A-2	1.4×10^{-2}	B-26	2.3×10^{-3}	NaOH	6.5	C-62	3×10^{-2}	0.18	3.3	4	1.5	3.3
15	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	4.8	C-62	3×10^{-2}	0.13	4.7	12	0.13	4.7
16	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-64	1×10^{-2}	0.13	4.1	8	0.16	4.5
17	A-2	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	6.2	C-64	1×10^{-2}	0.14	3.5	4	0.30	4.6
18	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-1	1×10^{-2}	0.13	4.2	8	0.14	4.6
19	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-8	1×10^{-2}	0.13	4.1	8	0.14	4.4
20	(本発明)	1.4×10^{-3}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-62	3×10^{-2}	0.14	4.4	10	0.15	4.7
21	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.8	C-62	3×10^{-2}	0.15	4.1	8	0.18	4.6
22	A-1	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	6.5	C-62	3×10^{-2}	0.16	3.5	5	0.25	4.6
23	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.2	C-62	3×10^{-2}	0.15	4.3	8	0.16	4.6
24	(本発明)	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	5.8	C-62	3×10^{-2}	0.16	4.0	7	0.17	4.5
25	A-24	1.4×10^{-2}	B-26	2.3×10^{-3}	NH ₄ OH	6.5	C-62	3×10^{-2}	0.18	3.5	4	0.23	4.6

[0286] With the heat developing sensitive material of this invention, Dmin (fogging) is low and it turns out that the engine performance with sufficient shelf life in which Dmax is high and is obtained. It turns out that a result with the still better case where the case where the compound of a formula (B) is especially used together, and ammonia are used for a pH regulator is brought about. As mentioned above, the effect of this invention is clear.

[0287]

Effect of the Invention] According to this invention, it excels in the engine performance as a high contrast sensitized material, and shelf life becomes good.

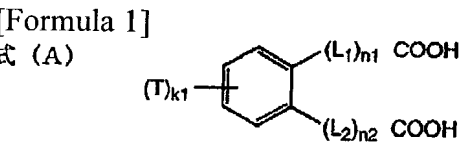
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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
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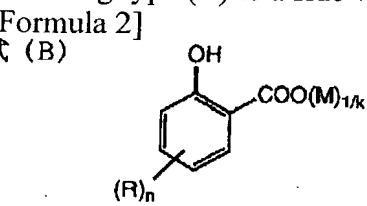
CLAIMS

[Claim(s)]
 [Claim 1] In heat developing sensitive material which has nonphotosensitivity silver salt, a photosensitive silver hali and a binder on a base material A latex of with a -30-degree-C or more glass transition temperature [40 degree-C or less] polymer is used as 50% of the weight or more of the binder of an image formation layer containing nonphotosensitivity silver salt and a photosensitive silver halide. And heat developing sensitive material which has a kind and ***** for an organic-acid compound expressed with the following type (A) to a side which has an image formation layer at least, and is characterized by a film surface pH by the side of an image formation layer being six o less.



T expresses a univalent substituent among [type (A), and k1 expresses or more 0 four or less integer. It expresses tha the whole of k1=0 is a hydrogen atom, and in the case of k1 >=2, you may differ, even if the same, and it may join together mutually, and two or more T may form the ring, respectively. L1 and L2 express a connection radical. n1 an n2 express or more 0 30 or less integer.]

[Claim 2] Heat developing sensitive material of claim 1 which ***** at least a compound further expressed with th following type (B) to a side which has an image formation layer.

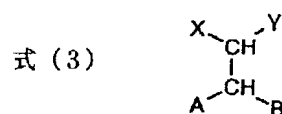
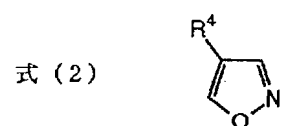
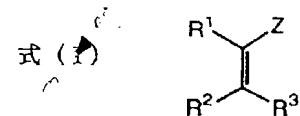


M expresses the cation of a hydrogen atom or k ** among [type (B), and k expresses one or more integers. R express a substituent, n is the integer of 1-4, you may differ, even if the same, and it may join together mutually, and R of ca plurality of n>=2 may form the ring.]

[Claim 3] Heat developing sensitive material of claims 1 or 2 which use ammonia for accommodation of a film surfa pH at least.

[Claim 4] One heat developing sensitive material of claims 1-3 which are a kind of compounds chosen from a substitute alkene derivative by which ***** is expressed with the following formula (1), a substitute isoxazole derivative expressed with the following formula (2), and a specific acetal compound expressed with the following formula (3) at least.

Formula 3]



In [type (1), R1, R2, and R3 express a hydrogen atom or a substituent independently, respectively, and Z expresses a electronic suction nature machine or a silyl radical. In a formula (1), it may join together mutually, respectively and R3, R1 and R2, and R3 and Z may form cyclic structure. [R1, Z,] In a formula (2), R4 expresses a substituent. In a formula (3), X and Y express a hydrogen atom or a substituent independently, respectively, and A and B express an alkoxy group, an alkylthio group, an alkylamino radical, an aryloxy group, an aryl thio radical, an ANIRINO radical heterocycle oxy-radical, a heterocycle thio radical, or the heterocycle amino group independently, respectively. In a formula (3), it may join together mutually, respectively and X, Y, and A and B may form cyclic structure.]

[Translation done.]